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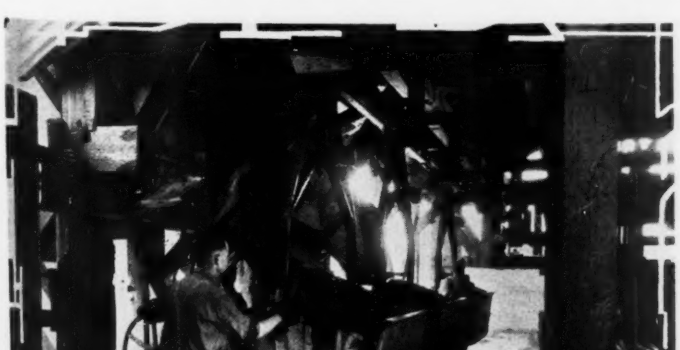
Novel Sand-Gravel Transportation

Aerial Tramway Connects Washing Plant in Willamette River to City Distribution Yard of Ross Island Sand and Gravel Co., Portland, Ore.

Material from the plant is received at the loading terminal (right) and carried by aerial tramway to distributing bunkers in Portland (left)

The dredge (circle) works between two narrow islands in the Willamette river

THE ROSS ISLAND SAND AND GRAVEL CO., 825 East Eighth St., Portland, Ore., is one of the largest producers of washed gravel in the Northwest, representing 40% of the total productive capacity of the Portland district. Up to within a short time ago no sand was taken from the Willamette river by any of the Portland producers; all was secured at various points along the Columbia river and towed on barges to this market. As it cost in the neighborhood of $65 to tow a barge of sand from the Columbia river dredging ground to Portland plus an additional cost of 10 cents per ton, including overhead, for dredging, it was highly desirable to develop a method of washing and classifying the sand associated with the gravel in the Willamette river deposits owned by the Ross Island Sand and Gravel Company.



Loading the 24-cu. ft. tramway buckets

The deposits now being dredged are located between Ross Island and Hardtack Island, two narrow strips in the Willamette river, about 1½ miles upstream from the center of Portland. The two islands split the Williamette river into three channels; the middle channel is the one from which the Ross Island Sand and Gravel Co. gets its gravel. This channel was evidently at one time more or less of a back wash, and as would be expected contains a considerable amount of fine material. To prevent drift wood and other debris from getting into the deposit from the river proper a sand and gravel dike was built connecting the head ends of the two islands, so the present dredging area has more the appearance of a lake than of a river.

Sand Classification the Big Problem

The deposit covers 385 acres, most of which will average 70% of pea gravel or

larger. About 10% is 2½-in. or larger. Of the remaining sand a very high percentage is minus 28-mesh, and this excess of fine material was one of the main reasons why the Willamette river sand had not been previously commercialized.

The superintendent of the plant, Otis E.

This adaption of the wheel classifier solved the problem of grading the river sand

Perkins, however, tackled this problem successfully and has developed a novel adaptation of the wheel type de-waterer or classifier; and since its installation the Ross Island Sand and Gravel Co. has met with excellent success in marketing sand from this river for the first time in the history of the sand and gravel industry of Portland.

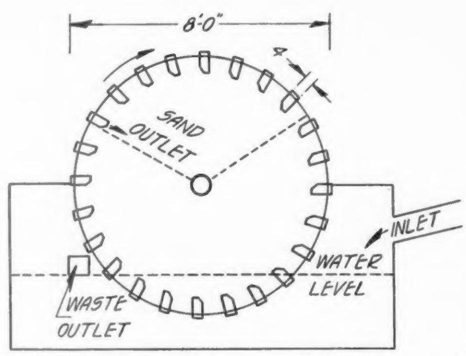
The classifier resembles a paddle wheel and consists of a circular steel disk 8 ft. in diameter, at the periphery of which are welded 24 rectangular pans, open at the side parallel to the main drive shaft. Each pan is 32 in. long, 4 in. deep and 6 in. wide, and all are mounted at right angles to the plane of the center disk.

The wheel classifier is mounted in a wooden box with the sand to be classified entering at one end and leaving at the other, as shown by the drawing. The important feature of the classifier, according to Mr. Perkins, is to have the spill of the buckets in line with the overflow, then by regulating the revolutions per minute of the classifier (2 to 12 r.p.m.) any classification desired can be made, up to and including coarse roofing gravel.

By watching the material that is delivered to the plant from the pump dredge the operators soon learn what speed the wheel must run to give the desired gradation of sand. Early operations of this deposit were by means of clamshell dredges, which left pot holes or pockets. These later became filled with fine sand. The present operators use an 80-ft. ladder suction dredge, and occasionally run into these old pockets of fine sand. Even under these adverse conditions the wheel classifier functions perfectly. Patents are pending on this classifier.

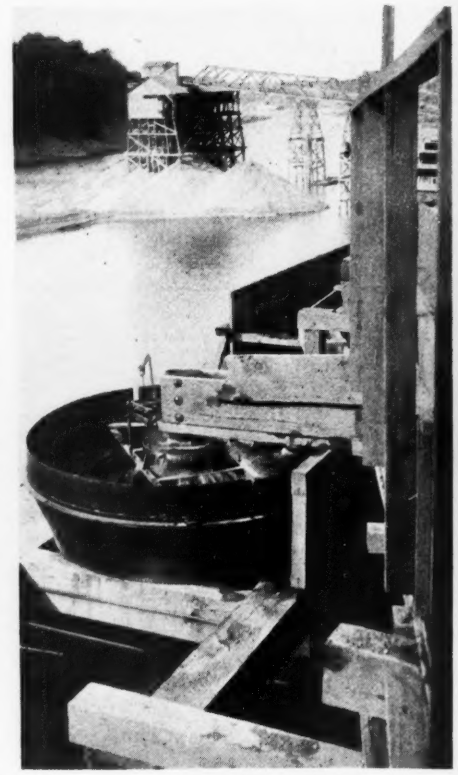
There are two of these classifiers, both driven by 5-hp. a.-c. variable speed G. E. motors through belt and gear reductions. The classifiers have a capacity of 250 cu. yd. per 9-hr. day each, and have been in operation better than two years with no expense for repairs. Two No. 40-2 Allen cones are available for production of mason's sand.

A second problem, one of transportation, had to be solved before construction work could be started. With the washing plant located on Hardtack Island of the Ross



Details of the wheel classifier

Island group, and about 100 ft. below street level in the city opposite, it was necessary to get the material to the top of the high river bank by either aerial tramway or a belt conveyor. On account of the high clearance that had to be provided and the long spans required an aerial, wire-rope tramway



Cones are used to prepare mason's sand

was selected to convey the product to the river bank, a distance of 1655 ft., and A. Leschen and Sons Rope Co. of St. Louis, Mo., was commissioned to design it.

Two sites for the discharge terminal of the tramway were available but the one at Eighth and Boise streets appeared the more desirable, and after overcoming many difficulties this was finally selected as the objective point toward which to build. There was private property to cross, railroad permits to get and a minimum clearance of 75 ft. was required by the government over the river channel. As finally agreed upon, the line was built out in the channel far enough that the tramway would clear adjoining private property, although this necessitated a 250-ft. cross conveyor from the stockpile to the tramway terminal.

The carrier equipment on the aerial tram-

General view of the washing plant on Hardtack island about 1 1/2 miles from the Portland distributing plant

The discharge terminal is located on the river close to one of the main streets, so deliveries can be made by truck. Railroad cars are loaded from the intermediate station on the lower level

way consists of 23 buckets each of 24 cu. ft. capacity. The carriers dump automatically and pass around the sheave at the outer end without detaching from the traction rope. In order to do this smoothly at a speed of 350 ft. per minute, this terminal sheave is 17 ft. 6 in. in diameter, and the line is of this gage for the entire length. The aerial tramway is capable of handling 135 tons of sand and gravel per hour and is motored by a 30-hp. Howell Electric Co. unit.

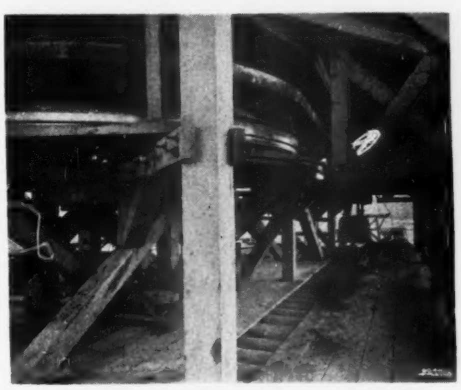
In order to comply with government clearance regulations of 75 ft. above low water and also to avoid high voltage power lines, tall towers were required, and the rail of the loading terminal is about 60 ft. above the water. A very extensive piling system was required under these structures, particularly the terminal structure, which was quite heavy.

By means of this tramway the company is able to ship material by rail and make city deliveries by truck, in addition to water shipments by barge. Shipments by rail are made over the Portland Electric Co.'s tracks. The railroad cars are loaded at a tower 110 ft. high, near the river's edge, where the buckets are automatically dumped as they pass through. The sand and gravel is dropped down through a steel pipe into a small bin directly over the cars. At the terminal on Eighth St. the sand and gravel is dumped on to a belt conveyor that distributes it to a series of bins where the various grades are kept separate and from which trucks are conveniently loaded.

The Dredge

The dredge, built by a local shipyard after designs by the company, is mounted on an 80-ft. by 30-ft. wood hull with a 6-ft. draft. The 80-ft. digging ladder is set back in a recess in the main hull a distance of 20 ft. The dredge as originally built had a 50-ft. digging ladder, but about eight months ago the present longer one, weighing 38 tons, equipped with a Swintek nozzle or cutter, was installed.

A 12-in. Amsco dredge pump, direct-connected to a 250-hp. variable-speed motor at present depth operates at 500 r.p.m. A 2-in. and a 3-in. Byron Jackson centrifugal pump, one direct-connected to a 5- and the other to a 25-hp. induction motor, supply water for priming the larger pump, for water cooling the main dredge pump bearings and other dredge uses. A 4-drum Hesse Ersted Iron Works hoist, direct-connected to a 20-hp. motor controls the digging ladder and is used for maneuvering of the hull. No spuds are used for anchoring the dredge, and such stability as is required is obtained through suitable lines to "dead men" ashore. A 25-hp. motor operates the Swintek nozzle.



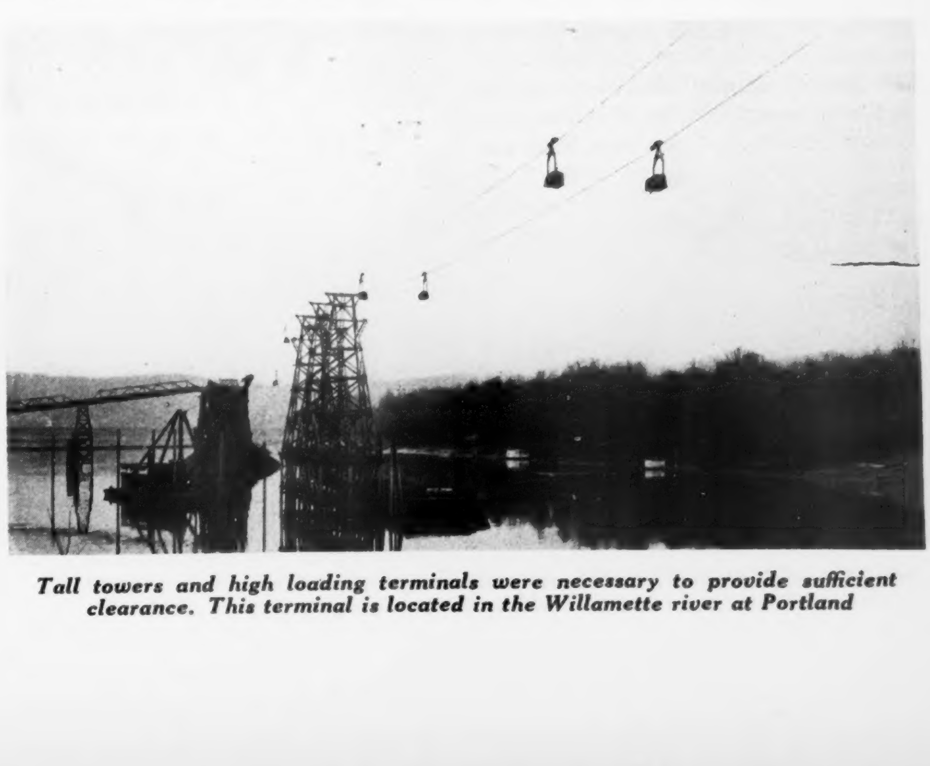
Carrier buckets are dumped automatically on to a belt conveyor which distributes the material to various compartments for graded material

Power is delivered to the dredge at 2300 volts and 440 volts through a lead covered submarine cable, and any excess cable is wound on a reel mounted on the deck of the dredge hull. All motors and electrical equipment are General Electric.

The dredge discharges through a 12-in. line, carried on $2\frac{1}{2}$-ft. by 12-ft. wood-stave pontoons, to a 300-cu. yd. capacity pit, built of sheet piling, at the plant. The pit overflows back to the river eliminating considerable of the silt at that point. The crushed oversize from the two crushers also discharges direct to this pit.

By pumping direct to this pit from the dredge instead of to the elevated hopper feeding the rotary screen a much lower lift of the sand and gravel naturally results. This results in more economical use of power and of the dredge, and will permit pumping to the plant from much greater distance than would be the case were the dredge pump called on to lift the material to the elevation of the rotary screen.

The gravel and sand in the pit are removed to the hopper feeding the trommel screen by a clamshell hoist using a 3-yd. Williams bucket and a Hesse Ersted hoist. The 85-ft. steel mast of the hoist is mounted above the pit, enabling it to make a 90-ft. lift from the bottom of the sump to the feed hopper. The Pacific Iron Works built



Tall towers and high loading terminals were necessary to provide sufficient clearance. This terminal is located in the Willamette river at Portland

A new 80-ft. boom has been installed on the dredge

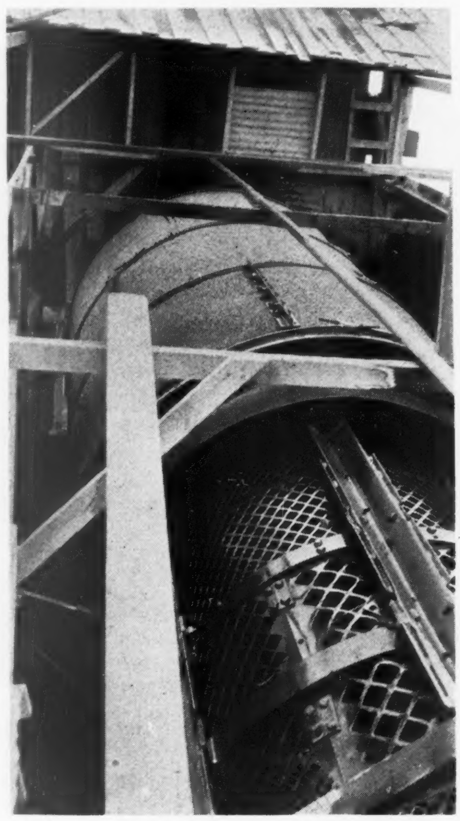
Stockpiles and the reclaiming clamshell dredge

the mast and boom. The hoist is driven by a 200-hp. variable-speed General Electric motor through a Texrope drive. This drive was taken up soon after its installation and has been in continuous operation since.

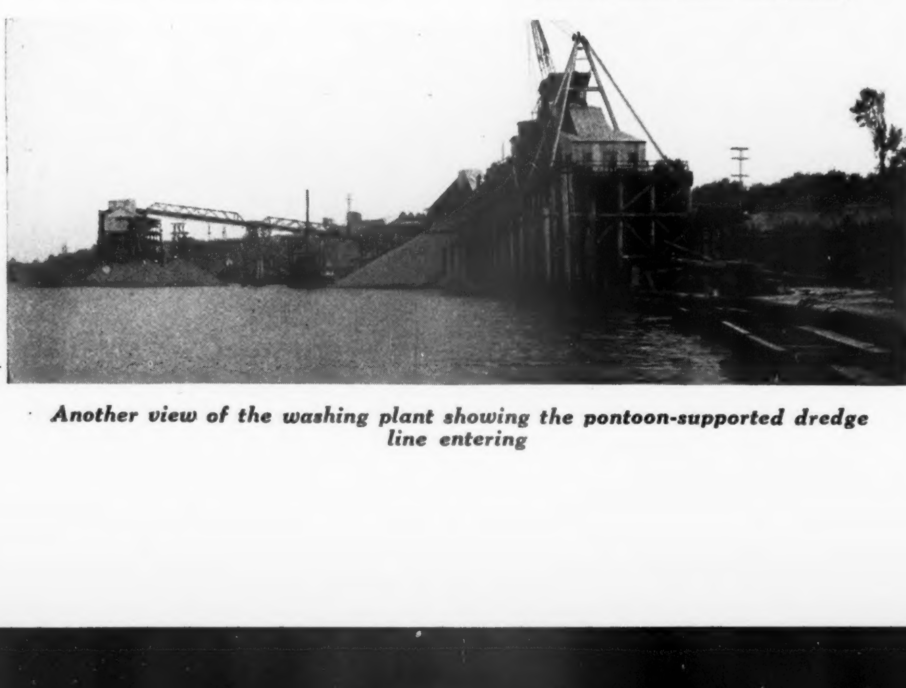
A rather novel and economical use of wire rope has been devised on this hoist. The greatest wear on the closing line is confined to about 12 ft. near the outer end, and if a single length of wire was used the loss of this 12 ft. virtually means the loss of the entire line. The operators here purchase double the amount of closing line needed and carry the excess on an auxiliary spool, which is a part of the main drum, and as needed 12-ft. lengths are cut off from the worn end and replenished from the spool.

Screening

The single 24-ft. by 6-ft. rotary screen, made by Hesse Ersted, has two jackets, a 12-ft. outer section of 3/16-in. by 7/32-in. wire cloth and a 20-ft. inner jacket of ¾-in. square-shaped openings. The inner barrel has 16 ft. of 1¼-in. square shaped openings at its feed end, and a 4-ft. end section of 2¾-in. square openings at the discharge end. The plates are all of high carbon steel, and are spot welded in place. Some bolts are used but for the most part, when a section becomes worn or needs replacing, that section is cut out with an oxy-acetylene or electric welding outfit, and the new one spot welded in place. Also any worn angle irons, lifters, etc., are brought back to their original strength and usefulness by use of the welder. It is said that a set of screens can be installed in far less time than under the old method of using bolts. A 300-amp. General Electric arc welding outfit is used for this work. The rotary screen is driven by a 30-hp. Allis-Chalmers motor through a Texrope drive. This type of drive is used throughout the plant.



The inner screen has square-shaped perforations used diagonally



Another view of the washing plant showing the pontoon-supported dredge line entering

The oversize from the rotary screen passes to a No. 10 McCully gyratory crusher that discharges back to the dredge discharge pit. The gyratory crusher is set to discharge a 1½-in. product and is driven by a 75-hp. Allis-Chalmers motor.

As the deposit does not yield sufficient sand for market requirements the pea gravel is crushed to No. 14 sand by a set of 16-in. by 36-in. Traylor rolls, which also discharge to the dredge pit. A 24-in. belt conveyor driven by a 10-hp. G. E. motor serves the rolls. A Dings magnetic pulley protects the rolls from tramp iron. A 75-hp. G. E. motor drives the rolls.

A "Hum-mer" vibrating screen is used as a portable unit to prepare any specially sized gravel by simply suspending the screen under the desired chute from the rotary screen and letting the products discharge direct to the bins below.

Water is supplied by a Byron Jackson deep-well type, 10-in. pump, driven by a 40-hp. General Electric motor. This delivers 1200 g.p.m. to the screens and hopper. Two 6-in. pumps delivering 1200 g.p.m. at 40-lb. pressure supply water for the sand flumes and for some rinsing water.

The various sizes of commercial stone and sand fall to any of the 12 bins, each holding 120 cu. yd., from which the material may be drawn for loading barges direct, or drawn to a reclaiming belt system serving the aerial tramway. The reclaiming belt passes under the bins and discharges to a horizontal 24-in. belt running in a gallery over the stock piles. This belt can also discharge to stock piles that are partly under water by a Dodge tripper, or to a cross conveyor serving the head bunkers of the

aerial tram. The reclaiming and stock pile belts are 300 ft., center to center, and the reclaiming belt 250 ft., center to center. The belts are all driven by Allis-Chalmers motors, two 30-hp. and one 25-hp. being required.

For barge loading direct from the plant's bins a channel had to be dredged out alongside the plant and barges are loaded from these bins by means of a short conveyor, one end of which is mounted on an industrial track with the outboard end supported by cables extending back to the highest part of the bins. The support cable also rides on a special track so that the unit can be moved from bin to bin as desired.

The stone in the main stock piles is loaded to barges by a clamshell dredge. About 50% of the company's business is delivered by barges to points on the Columbia river as far distant as Astoria, a 109-mile haul. The remainder of the business is from the distribution yard served by the aerial tramway.

Distributing bunkers and office, Ross Island Sand and Gravel Co.

Mixer in the ready-mixed concrete plant operated by the company

The plant has a capacity of 1000 yd. per 9-hour day and employs a total of five men, one on the dredge, one on the tram and the other three at various places throughout the plant. This small number of employes makes the operation one of the most economical to be found anywhere.

The bins and buildings are all of wood construction resting on piling foundations at sufficient elevation above the river to permit convenience in loading the barges. The Willamette river has a 5-ft. tide range at the plant.

Truck-Loading Bins

The aerial tramway discharges to a hopper that feeds by gravity to a 20-in. belt conveyor running over the top of eight wooden bins from which trucks can be loaded, or to a second belt passing under the bins, the purpose of which is to deliver aggregate to the ready-mixed concrete plant that was installed recently. This conveyor discharges to a movable spout serving four bins at the mixing plant. A 10-hp. and a 15-hp. motor drives the two conveyors respectively.

The mixing plant consists of a 3-yd. El Oso Asphalt Co. mixer, built by J. R. Hely of St. Louis, which was originally designed for a two-drum unit and intended to be used in the preparation of asphalt, but Harold Blake, general manager of the Ross Island Sand and Gravel Co. and sole owner of the ready-mixed plant, adapted its use for preparation of concrete. The mixer is driven by a 35-hp. Allis-Chalmers motor through a Dayton "Cog-Rope" drive. Cement is delivered to the plant by truck in sacks, which are dumped to a short Link-Belt screw conveyor which elevates slightly, discharging to the mixer.

The aggregates used are drawn by gravity to the underslung, suspended, point-type hopper of the Toledo scales. This hopper discharges by gravity direct to the mixer.

Harold Blake, general manager, Ross Island Sand and Gravel Co.

Hauling is done in ordinary trucks, some of which have been fitted with "bath-tub" bodies. The plant has a capacity of 500 yd. per 9-hour day and requires three men to operate.

The company also has a central mixing plant at its Albina yards of the same type as at the main plant, but uses trucks for delivery of the aggregate in place of a belt conveyor.

Personnel

D. L. Carpenter is president of the Ross Island Sand and Gravel Co.; W. H. Muirhead, vice-president, and Palmer Fales, secretary. Harold Blake is general manager. A. V. Kramer is cashier in charge of the plant office.

Manganse as a Fertilizer

SOME interesting experiments on the application of manganese compounds to the South Atlantic coastal plain soils are reported in a recent issue of the *American Fertilizer*. The results indicate that for crops of low money value the soil should not be limed to a reaction less acid than pH 6.5. Manganese sulphate can be used on any unproductive spots that develop on account of variability of the soil. On soils already overlimed, manganese sulphate can be used as a fertilizer, or the soils can be acidified by applications of sulphur. The latter method has been successfully used, but the cost and efficiency have not been determined. The free use of ammonium sulphate as a source of nitrogen has also been found effective in remedying the damage from moderate overliming.

Acid soils on which acid-intolerant crops are to be grown must be limed and some available form of manganese may well be used in the fertilizer as a precautionary measure if the ultimate reaction is to be less acid than pH 6.5. Trucking soils already limed to neutrality will not need further liming.

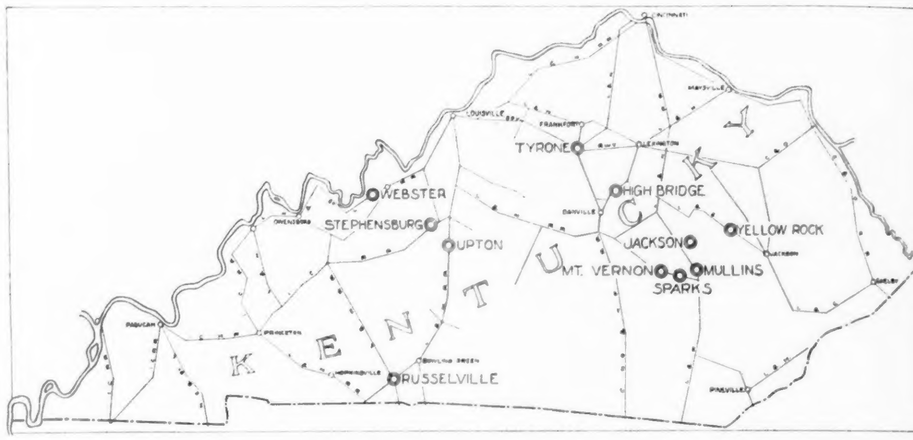
Why Consolidations in the Crushed Stone Business?

Because It Permits Its Becoming a Regular Industry

By Charles W. Lovell

Chief Engineer and Sales Manager, Kentucky Consolidated Stone Co., Louisville, Ky.

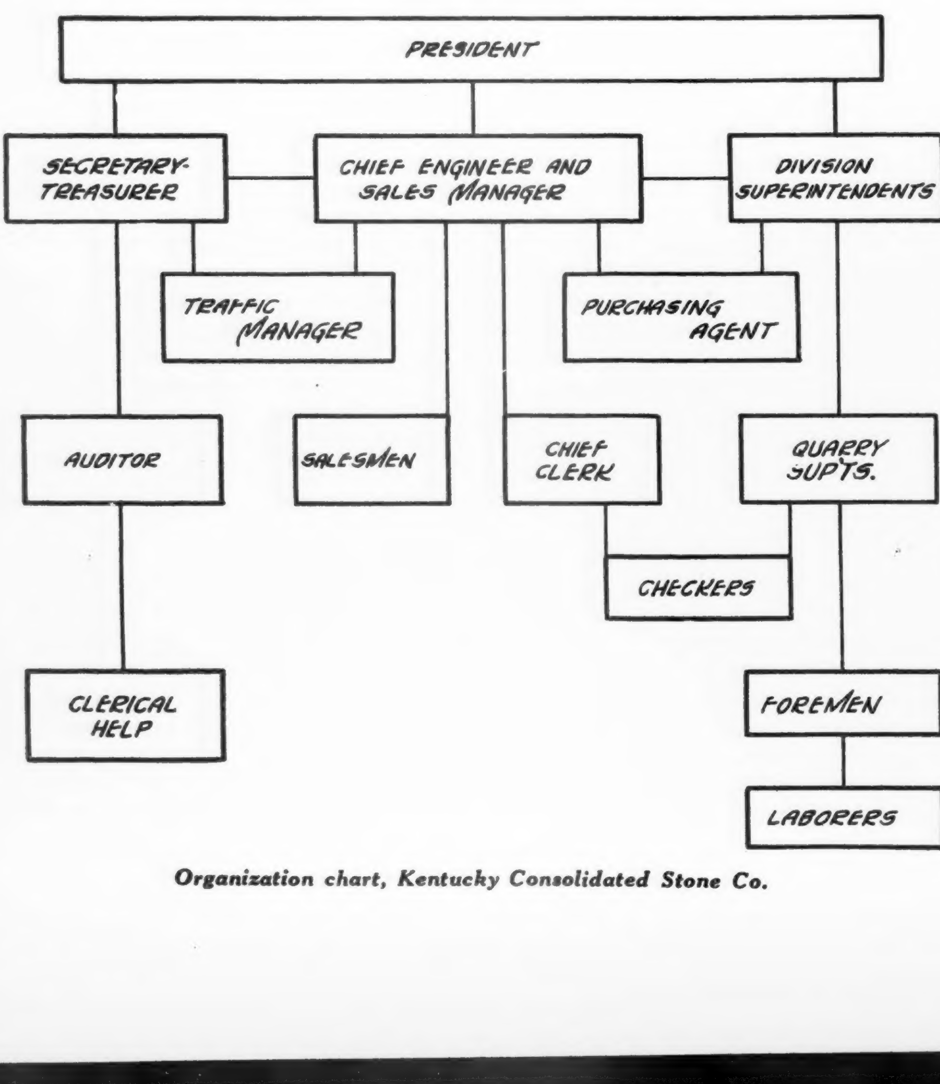
ON MAY 1, 1928, when consolidations and mergers were at the height of their fashion, the Kentucky Consolidated Stone Co. became a reality. For some time such combinations have been dictated largely by the necessity for bigger operating units and subsequent economies. With this idea in view the present management purchased outright 10 of the largest commercial crushed-stone quarries, equally distributed throughout Kentucky, financing this purchase by floating new issues of securities. These 10 units had produced for several years approximately 80% of all commercial stone in Kentucky and were operated by seven separate and distinct concerns.



Showing the locations of the Kentucky Consolidated Stone Co.'s quarries

The original idea of effecting economy by combined management, thereby materially reducing overhead, supervision and operating expenses, has proven true. Under the combine two general division superintendents replace the original 10, and three salesmen compose the entire sales force of the present company, doing the work of at least 12 under the former management.

This reduction in the number of employes in responsible charge is applicable to the purchasing, as well as the bookkeeping departments, which work is now handled by the central office, with a small force and under efficient management. The accompanying chart shows the scheme of the present organization.



Organization chart, Kentucky Consolidated Stone Co.

Division Superintendents

The 10 quarries are so located that the two division superintendents can keep in close touch with each of their respective group of plants, and their entire time is spent in the field. These superintendents are in actual charge of production and are held responsible for efficient operation of the quarries under their supervision. They approve all requisitions for material and supplies as well as recommend ratings for all production employes.

Quarry Superintendents

Over each quarry or group of quarries (when two or more are located in the same locality only a few miles apart) is placed a quarry superintendent. He is assigned a checker who handles the paper and office work, leaving the superintendent free to spend his entire time in the quarry or about the plant. He is permitted to hire foremen and shovel runners, as well as other classified and common laborers that he needs to operate his unit.

Purchasing Department

A purchasing agent, the latest addition to our organization, has proven an asset. All requisitions originate with the quarry super-

intendents, are approved by the division superintendents and then forwarded to the purchasing agent, who buys all supplies. This centralized system of buying of supplies for all our quarries has saved a considerable sum during the few months it has been in operation. A big saving in explosives alone has been effected, as well as numerous other items, including mill supplies and crushers, as well as loading and conveying equipment.

High Bridge quarry showing the working face of over 100 ft.

Sales

The annual production of approximately one and one-quarter million tons is sold by a very small sales force, consisting of a sales manager and two salesmen. Half the time of each salesman is devoted to sales promotion of agricultural limestone, a by-product, the use of which is in its infancy in this territory, however; sales on this grade of material alone have more than doubled in 1929 over 1928. Agricultural lime is sold direct to the farmer, which policy has proven much more successful than to sell through dealers, as generally the dealer makes no effort to promote its use. This method of selling direct to the consumer takes time, patience and effort and it is somewhat difficult to find high-class salesmen suited for this kind of work, which requires conducting an educational program among the farmers.

When a sale of any grade of stone is made, a shipping order in triplicate is filled in by the salesman on a standard form, which clearly states amount of tonnage, price, terms, rate of shipment, kind of railroad cars, destination, etc., a copy of which is delivered to the customer, one copy to the quarry from which the shipment is to be made and the original is forwarded to the central office, where the order is checked by the sales manager as to unit price and credit rating of customer. If approved, the quarry superintendent is instructed to make shipment. When credit is not established, shipments are made sight-draft, bill of lading attached, and the consignee so advised.

Invoices and Statements

The checkers at the various quarries invoice all materials shipped on the day shipments are made. One or more copies with the original goes to the consignee (depending on their requirements), one copy to the central office and one copy is retained by the quarry superintendent. The central office checks invoices against shipping orders and daily reports, verifying weights, etc., and prepares all statements. Bills of lading are sent to the central office attached to copy of invoice.

Collections

All collections are handled by the central office. Statements are submitted monthly, as soon after the first of each month as

Tyrone quarry showing the primary crusher on the quarry floor elevation and secondary crushers and screening plant on railroad elevation

practical. If remittances are not received within 10 days, a personal letter is sent to the delinquent customer. If this does not get results, a second and third letter is sent out, and in some instances a representative of the company is dispatched to call on the customer in person before other means are resorted to in the form of a claim against the contractor's estimate and surety bond, or in extreme cases a lawsuit. It might be interesting to know that this company, doing about $1,000,000 worth of business in 1928, lost less than 1/20 of 1% through bad accounts accumulated over that period.

The Upton quarry is worked in two 40-ft. lifts

Reports

Each quarry checker is required to submit carefully compiled daily reports of operation, including materials shipped each day, as well as a daily labor report. There are only a few reports required in addition to these, as it is believed impracticable to burden the quarry office help with superfluous reports; and every effort is made to keep them to a minimum, emphasizing the fact that the central office must receive the required data promptly. From the individual quarry reports are compiled daily operating statements showing tonnage produced, labor and supervision costs and causes for delays at the various quarries. The reports, worked up by the central office, go to make up the monthly statement which is issued to the officers of the company at the close of each month. The monthly statement tells the story as to what has been accomplished for the period which it covers. It is an accurate accounting of profits and losses, as well as their distribution. This statement goes one step further and gives a comparison of business for the previous month.

Traffic Department

The services of a traffic manager have been found to be indispensable. Not only is he responsible for quotations on all freight rates, but he also handles the claims for overcharges and reparations for loss of materials in transit, audits all freight bills and assists materially in obtaining reductions in freight rates that are out of line.

Management

The success that we have enjoyed thus far has been largely due to the efficient management. The company was fortunate in being able to retain the cream of the former management on salaries commensurate with their responsibility. These have been supplemented by men experienced in similar fields of endeavor which has proven to be the combination desired.

Volume of Construction Contracts Awarded in 1929 13% Under 1928

CONSTRUCTION CONTRACTS recorded during the year 1929 in the 37 eastern states reached a total of $5,754,290,500, according to F. W. Dodge Corp. Compared with the total for the record year 1928, this was a decrease of 13%. Commercial and industrial building reached a combined total of $1,689,200,800 last year, an increase of 11% over 1928; these classes of work usually increase when general business activity and the stock market are on the upswing; public and institutional buildings of all kinds (constituting the remainder of the non-residential classes) amounted to $901,020,200 last year, representing an 8% decrease from 1928. Non-residential building as a whole had contract expenditures just 3½% above those of 1928.

The decline was most severe in residential building, whose 1929 total was $1,915,727,500, being 31% under the 1928 total. Even public works and utilities, contracts for which kept somewhat ahead of 1928 very nearly to the end of the year, finished with a contract total 7% under that of 1928, or $1,248,342,000 as compared with $1,337,930,500.

Although the financial upheaval which reached its climax in late October was in the nature of a removal of serious obstacles to construction improvement, it came too late to aid any improvement in the 1929 construction record. December contracts amounted to only $316,368,100, which was 27% under the total for December, 1928, and 19% under November, 1929. The month's record included: $114,049,800, or 36% of all construction, for residential buildings; $67,392,400, or 21%, for industrial projects; $51,821,300, or 16%, for public works and utilities; $33,392,100, or 11%, for commercial buildings, and $19,841,800, or 6%, for educational buildings.

A much more promising showing was made in the December record of contemplated projects. New plans reported during the month amounted to $864,220,600, an increase of 19% over the amount reported in December, 1928, and a 20% increase over November, 1929. The total of contemplated new work reported in the entire year was $8,886,017,500. This was 54% in excess of the amount of contracts, a very good indication that the year closed with a considerable volume of unsatisfied construction demand.

During the closing month of 1929 contracts let in New York state and northern New Jersey amounted to $115,187,900. The December total was off 31% from the preceding month and was 17% less than the total for December, 1928. The classes of building found to be most active in the month were the following: $69,544,000, or 60% of all construction, for residential buildings; $10,324,300, or 9%, for educational buildings; $9,947,900, or 8%, for commercial buildings, and $7,507,300, or 7%, for public works and utilities.

New building and engineering work contracted for in the entire year of 1929 amounted to $1,467,272,000 compared with $1,819,316,800 for 1928, a decrease of 19%.

Contemplated projects as reported during the past month reached a sum of $287,813,600. This figure was 25% ahead of November, and a further increase of 48% was registered over the December month of 1928.

Gypsum Industry on the Pacific Coast

Part I—Many New and Novel Applications Have Greatly Extended Its Use

By Walter B. Lenhart
Associate Editor, Rock Products

THE GYPSUM INDUSTRY on the Pacific coast has been suffering from serious overproduction for the past four or five years with resulting price cutting, low prices and generally unsatisfactory conditions, as a result of which practically none of the producers has operated at a fair profit, and there has been no construction of new plants, outside of the one built by the United States Gypsum Co., at Midland, Calif. The plant at Midland can be considered more of a replacement than a new plant, as that company is centralizing its production at that location in place of at the older plant at Arden, Nev. However though new plant construction has been at a stand still there have been many changes in methods of operating that have resulted in more efficient operation, better quality of material; and there has been a development of new products that will ultimately extend the use of gypsum.

Keen Competition

An unusual condition exists on the Pacific coast in connection with wall-board production in that none of the plaster producing companies manufacture wall-board, that commodity is in all cases manufactured by independent companies who purchase their stucco requirements on the open market. With competition very keen in that branch of the industry they too have developed and are marketing new products and better products. This competition has been so fierce that several of the wall-board companies are simply marking time, with their plant operations at a standstill, until better prices are to be obtained.

The quality of plaster has been raised to such an extent and the raw material is of such high quality that it is my personal opinion that on the average Western gypsum products are superior to those produced in East or Middle West. The gypsum from Nevada, southern California and Mexico is all of the same high quality with guaranteed analyses of from 93 to 95%, which here means that the actual content will be closer to 97 to 98% gypsum. With this high grade material to work with and with close plant and sales supervision, double supervision, that sees to it, for instance, that no old plaster gets out on the job, as well as many minor mill supervision details, has tended to educate the plasterer to such a degree that he is literally spoiled. He has been educated to the fact that he can get plaster that will carry from 26 up to as high as 32 shovels of sand to the sack (100 lb.), and if the material is lacking in that respect he does not hesitate to ask for (and he usually gets) an adjustment of some sort to make up for the difference between what he got and what he thinks he ought to have got. With competition so pronounced, there is no doubt that the plasterer has often taken advantage of it.

Gypsum finds some use as an exterior stucco

Although there is considerable gypsite on the West Coast, particularly in Nevada, some of the deposits being worked years ago, none now can begin to compete with the rock gypsum, and it is doubtful if these deposits ever will be exploited again, because their sand carrying capacity is so low as to put them out of the running entirely. These deposits, however, if located in most of the eastern sections of the country probably could successfully compete with the rock gypsum plaster.

Standardized Kettles in Use

The gypsum plants on the Pacific coast all use the kettle for calcining, none using the rotary kiln and all the kettles are standardized to the conventional 10-ft. size, with most of the producers using the extended top type, so that the average tonnage per kettle is between 11 and 12 tons. The time of calcination, likewise does not seem to vary much from plant to plant, 2¾ hours being about the average, with no variation of over 15 minutes, maximum or minimum. They all use recording thermometers for determining the end point, Bristol and Foxboro dial types being favorites. Here again there is very little to be said as to the different temperatures to which the rock is calcined, these temperatures ranging from 310 to 350 deg. F., depending on some particular ideas of each manufacturer, although without a doubt they all could calcine to the same identical temperature without jeopardizing their quality, provided it was somewhere within the ranges.

The Raymond mill for fine grinding is very popular and is used in all the plants built within the last five years, and in some of the older ones as well; and with one exception regrinding has been eliminated. All are grinding to a fineness of from 89 to 92% minus 100-mesh before calcining, going to 95% minus 100-mesh for some of the higher grades of casting plaster and other high grade plasters.

Either oil or natural gas is used for fuel, no coal being burned in any of the mills. Steel kettle-bottoms have practically in all cases replaced the old sectional or cast-iron bottoms, resulting in far less trouble with leaks and consequently cleaner fire-boxes, flues and wing walls, conditions all of which make for economy in fuel consumption. With the steel bottoms and oil for fuel, consumption of fuel per ton will range between 6 and 7 gal. of oil, depending on the skill of the particular operator; and with gas, while the figures in cubic feet per ton are not available, the costs per ton of stucco for that fuel have been quoted as between 20 and 22c. The steel kettle-bottoms have been in continuous operation for four to five years in many of the mills, and their life seems to be unlimited. One operator stated that he had not removed over a ton of dust from his fire box in the last three years, which contrasts quite strongly with the older sectional or cast-iron bottoms where it was not unusual to remove that amount of material every week, or even every day.

The plaster mills that are located on the Pacific coast or serve that market entirely are located, beginning at the extreme southern end of California, at Plaster City (3 kettles), operated by Pacific Portland Cement Co.; Midland (3 kettles), operated by United States Gypsum Co.; Los Angeles (3 kettles), operated by Blue Diamond Co.; Long Beach (3 kettles), operated by Standard Gypsum Co.; Arden, Nev. (4 kettles), operated by

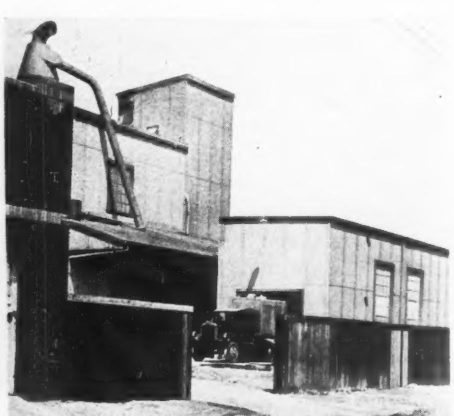
Partial view of older plant of Schumacher Wallboard Co.

United States Gypsum Co.; Ludwig, Nev. (4 kettles), operated by Standard Gypsum Co.; Gerlach, Nev. (5 kettles), operated by Pacific Portland Cement Co., and Seattle, Wash. (2 kettles), operated by Standard Gypsum Co.

These producing units have a total of 27 kettles, which for practical purposes have a production capacity of 2700 tons per day, but it is doubtful if the market requirements are even half of that figure. At the time most of the plants in California were visited, the price of plaster had risen $1.50 per ton, so that the operators were realizing some profit; but conditions were still unstable. This statement applies more to southern California than to the balance of the coast, as San Francisco and the Bay markets always have been more stable and better priced, due largely to the fact that only the more favorably situated mills can reach that market. Here again, some qualifications must be made for at Seattle and the State of Washington, a comparatively restricted market, even though seven brands of plaster are sold, prices are higher than at any place on the coast. Were the prices obtained in the south portions of this section as good as at Seattle, the producers would be in a more fortunate condition.

Schumacher Wallboard Co.

The largest producer of wall-board on the coast is the Schumacher Wallboard Co., Los Angeles, Calif. Soon after its merger the Schumacher company built a new wall-board plant across the street from its older plant using an Ehrsam wall-board machine and a Coe dryer. This company at present is securing its stucco from the Long Beach plant of the Standard Gypsum Co., and is hauling that material in bulk in tank trucks. The truck pulls a trailer and both truck and trailer carry rectangular duraluminum tanks with discharge gates at the rear. The tanks carry a total of about 20 tons and are used to transport the stucco a distance of approximately 24 miles. The tanks are simply filled by drawing the stucco from overhead bins by a suitable spout. This novel method of transportation has proven very economical, quick to load and discharge, no return sack to bother with at either the loading or discharge end, and it has eliminated the expenses incidental to unloading cars of sacked material. Previous to the installation of this method of haulage the company secured all its stucco in burlap sacks in car-load lots, which were unloaded at the old plant. Here the sacks were emptied to a Fuller-Kinyon pump that delivered the stucco to the new plant across the street. The Fuller-Kinyon pump worked very satisfactorily on this more or less cold stucco. The plant of the Schumacher Wallboard Co. is located at San Pedro St. and Slausen Ave. A. R. Moylan is general manager.



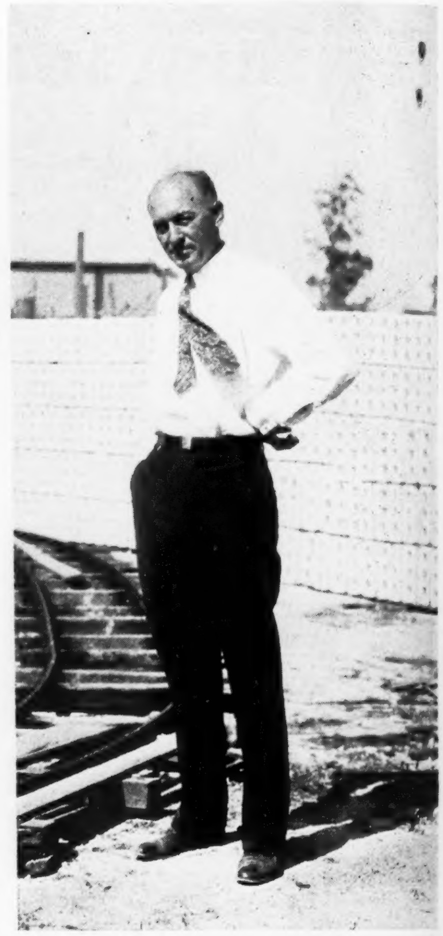
Receiving stucco in bulk by trucks at the Schumacher plant

Sierra Gypsum Products Co., Ltd.

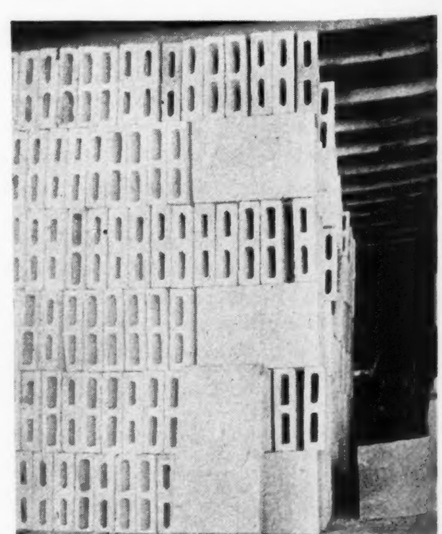
The Sierra Gypsum Products Co., Ltd., are successors to the old Buttonlath Manufacturing Co., Los Angeles, Calif., well known as the manufacturers of a gypsum plasterboard marketed under the name of Buttonlath.

Alva Warren Tyler, a well-known gypsum plant engineer, with a wide experience in the gypsum industry (and a frequent contributor to Rock Products) was chief engineer in charge of design and the company placed in operation at its plant what is considered to be the last word in automatic gypsum tile machines.

The machine uses a continuous mixer which discharges to a series of aluminum pans or molds, mounted not unlike an ordinary pan conveyor, and as the pans are filled they move away from the mixer in an endless stream. At a point in this line of pans, when the plaster has sufficiently set, an automatic core remover pulls the three cores from the mold in the horizontal position. The core pieces are then returned to the head end of the conveyor by a suitable conveyor.



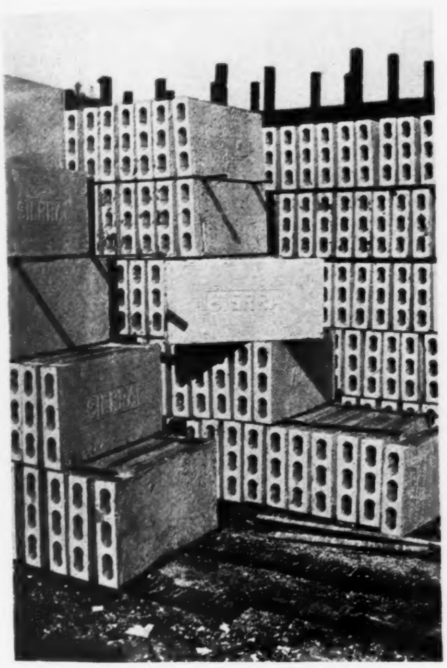
Alva Warren Tyler, designer of a new tile machine



Illustrating one of the old type of gypsum tile used on Pacific Coast

The aluminum molds when they come to the end of the conveyor discharge their tile by gravity in conjunction with a pair of valves that are located in the bottom of the pans. These valves, at the time the pan starts on its return to the mixer, automatically raise and push the tile from the mold. The tile then fall to a belt conveyor and are carried to the yard and air dried. Aluminum pans are used for the molds because it has been found that there is less likelihood of the gypsum sticking to this metal.

There are three cores to each tile and each core is made up of two parallel



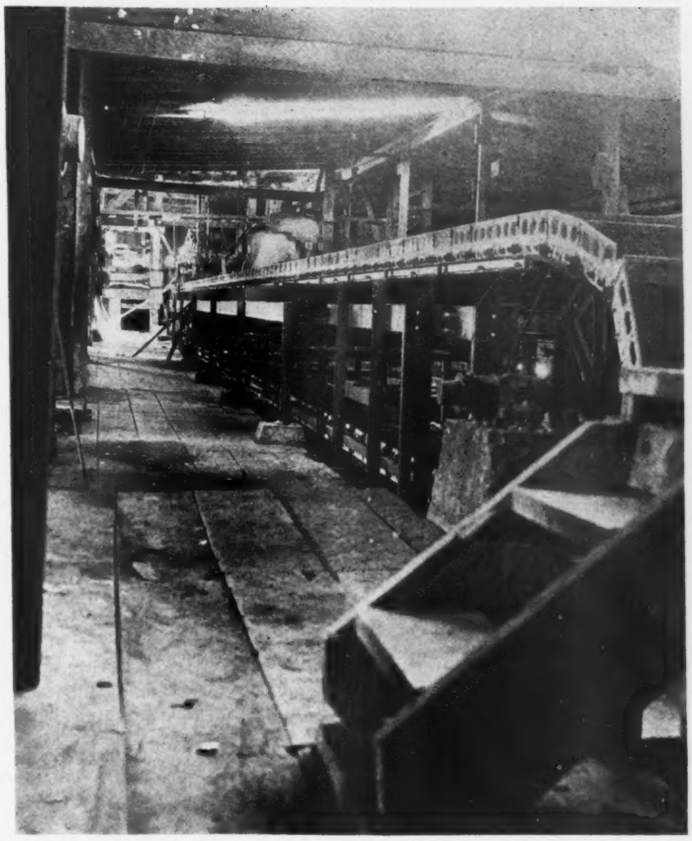
The new design of core gives greater strength

pipes with a metal shield paralleling and covering the interstice formed by the two pipes. The construction or mechanism beneath these shields is of such a nature that when an eye bolt located at one end of the core is quickly pulled the two pipes move longitudinally closer together. This contraction is sufficient to free the core from the mold. The core puller is so designed that as the pans pass the puller, hooks engage with the eye of the core, give it a quick jerk that contracts the cores and pulls them completely from the mold. The machine is said to have made 100,000 tile without producing a single broken tile.

The tile industry on the west coast is similar to the wall-board industry in that only one of the plaster producers manufactures that commodity. At one time there were a host of independent companies making tile by hand-mold methods, and they allowed their product to deteriorate in quality to such an extent that the industry was practically ruined.

The American Society for Testing Materials specifications for tile require that they sustain a load of 75 lb. per sq. in. of bearing area. This tile is said to run close to 200 lb. per sq. in., as the design of the walls of the tile are such as to give a thicker wall at what previously was the point of weakness. The shape of the core resembles the shape of the ordinary briquettes used for tensile strength determination. This shape then tends to reinforce the wall of the tile where an ordinary tile is thinnest and weakest. The cores are perfectly straight without taper, thus producing a tile whose cross-section is the same at every point giving uniform protection and strength throughout the length of the tile.

The tile can be made in thicknesses of 3 in., 4 in. and 6 in., with three cores per tile, for the 3 in. and 4 in. sizes and six cores for the 6 in. size, and a surface of 12 in. by 24 in. One face of the tile is corrugated and carries the trade-mark "Sierra," the opposite face is scored to give a mechanical key for plastering. The edges are specially grooved to give an interlock for the mortar joint. About 5% wood fiber is used in connection with the quick-setting stucco. The plaster is all accelerated at the mill so as to give a 5-min. set or less. The machine will turn out 2400 sq. ft. per hour, although the market requirements are only at present about 10,000 sq. ft. per day. The company expects, however, to increase the market range by delivering a much more satisfactory tile.



The gypsum tile are cast flat in this new machine

The table below shows the size and weights of the tile of this design, both for furring and partition tile.

Weights of Gypsum and Clay Tile

The following table is interesting and enlightening. It shows at a glance the weights of Sierra gypsum tile in comparison with clay tile. Notice the difference in favor of gypsum tile, the lightness of which makes possible a marked saving in all supporting members and insures more rapid construction.

Thickness	Sierra gypsum tile weight per sq. ft.	Clay tile weight per sq. ft.
2-in. Hollow	5.6 lb.	12 lb.
3-in. Hollow	8.5 lb.	18 lb.
4-in. Hollow	11.5 lb.	22 lb.
6-in. Hollow	16.8 lb.	25 lb.

3-in. tile in place	Hollow Sierra tile	Hollow clay tile
Unfinished 3-in. per sq. ft.	8.5 lb.	18.0 lb.
Mortar for setting sq. ft.	1.8 lb.	3.5 lb.
Plaster both sides sq. ft.	6.0 lb.	9.0 lb.
Total weight per sq. ft.	16.3 lb.	30.5 lb.

The offices of the Sierra Gypsum Products Co., Ltd., are at the plant at 2800 E. Vernon Ave., Los Angeles, Calif. J. A. Jevne is president and W. H. Price general manager.

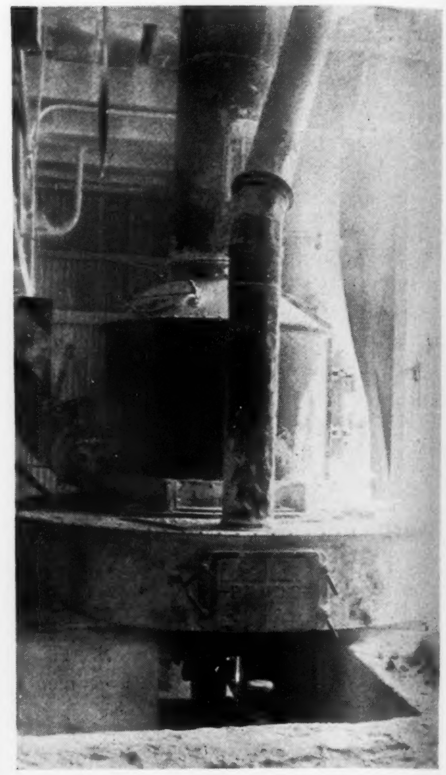
Blue Diamond Co.

The Blue Diamond Co., Los Angeles,

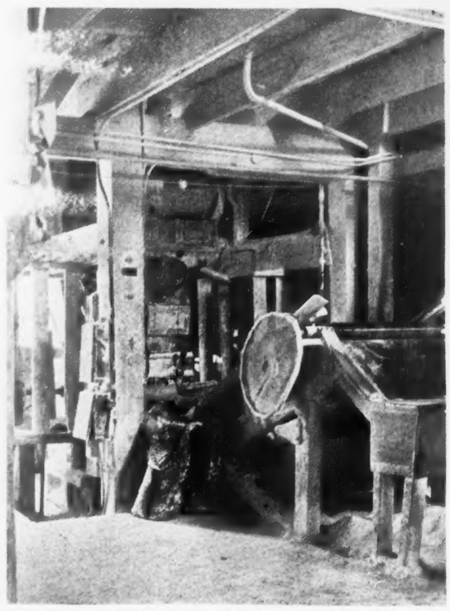
TABULAR DATA DESIGNED TO AID USERS OF GYPSUM TILE

Sizes of Sierra Gypsum Tile	For ceiling heights up to	Weight of tile per sq. ft. Lb.	Weight of mortar per sq. ft. Lb.	Weight plaster one side ½-in. grounds per sq. ft. Lb.	Total weight plastered one side per sq. ft. Lb.	Weight plaster two sides per sq. ft. Lb.	Total weight plastered two sides Lb.	Average amount materials required for setting Sierra tile per 1000 sq. ft. Mixed 3 to 1: Gypsum plaster	Sand
1½ in. Split —1½x12x24 in.	Furring	4.2	1.2	3	7.2			215 lb.	0.26 cu. yd.
2 in. Split —2 x12x24 in.	Furring	5.6	1.2	3	8.6			296 lb.	0.37 cu. yd.
2 in. Solid —2 x12x24 in.	10 feet	9.4	1.4	3	12.4	6	15.4	310 lb.	0.41 cu. yd.
3 in. Hollow—3 x12x24 in.	13 feet	8.5	1.8	3	11.5	6	14.5	450 lb.	0.50 cu. yd.
4 in. Hollow—4 x12x24 in.	17 feet	11.5	2.2	3	14.5	6	17.5	615 lb.	0.67 cu. yd.
6 in. Hollow—6 x12x24 in.	30 feet	17.0	2.7	3	20.0	6	23.0	800 lb.	0.98 cu. yd.
8 in. Hollow—8 x12x24 in.	40 feet	23.0	3.6	3	26.0	6	29.0	1000 lb.	1.33 cu. yd.

Offices of the Blue Diamond Co., Los Angeles, Calif.



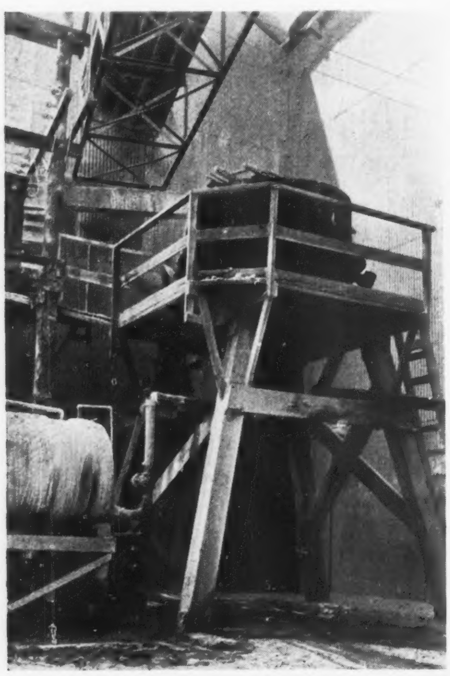
Mill for raw grinding has unusual capacity



Incline conveyor from packer to warehouse floor

Calif., secures its gypsum from quarries located near Arden, Nev. The gypsum is crushed at the quarry and hauled to the plant at 1650 So. Alameda St., in open gondolas, via the Union Pacific Railroad.

Raw grinding is done by two vertical burr stones and a single low side, five-roller Raymond mill. These mills are all set to deliver a product 70% minus 100-mesh, at which fineness the material is



Dust-sludge disposal equipment at the Blue Diamond Co. plant

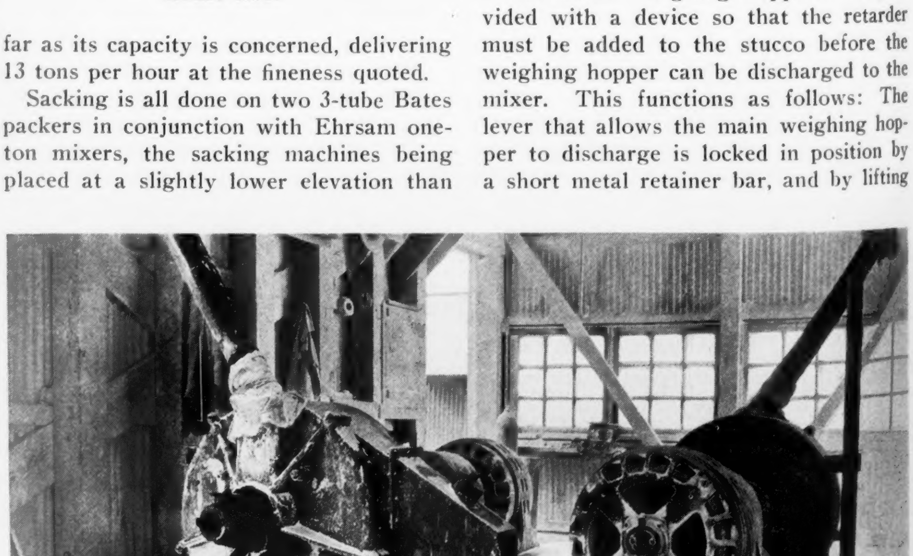
calcined. Six regrind burrs are used for regrinding the stucco for fibered hardwall and casting. The regrinds deliver a product 90% through 100-mesh. This is the only plant on the Coast using burrs for grinding as well as the only one that continues to regrind.

There are three 10-ft. Ehrsam kettles, gas fired, with extension tops with the fog from the kettles passing to a dust collector.

The kettles are calcined to 330 deg. F., with a time cycle of two hours. A primer charge is left in each kettle between each cycle. The Raymond mill is unique as far as its capacity is concerned, delivering 13 tons per hour at the fineness quoted.

Sacking is all done on two 3-tube Bates packers in conjunction with Ehrsam one-ton mixers, the sacking machines being placed at a slightly lower elevation than the main mill floor and the sacked material falling to a belt conveyor that elevates to the main floor, where the sacks are received on hand trucks for delivery to the storage room or for car shipments. A warehouse is provided, as a large percentage of the company's business is by truck delivery.

The mixer weighing hoppers are provided with a device so that the retarder must be added to the stucco before the weighing hopper can be discharged to the mixer. This functions as follows: The lever that allows the main weighing hopper to discharge is locked in position by a short metal retainer bar, and by lifting

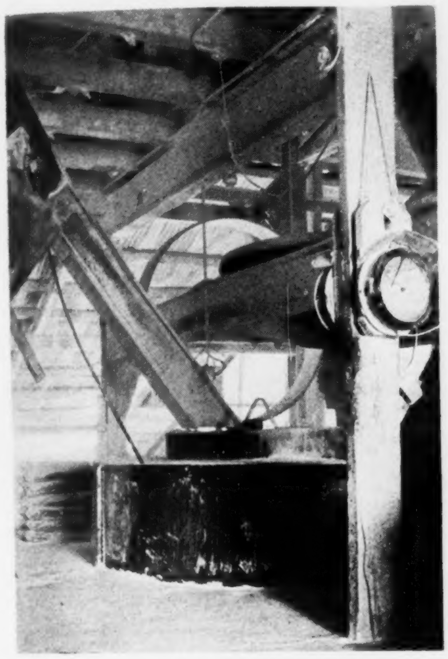


Vertical burr stone for regrinding used in the Blue Diamond Co.'s plaster mill

this short bar, which is hinged at the end, the hopper can be dumped. In addition, a rectangular scale pan is mounted on the rim of the main hopper in such a manner that, when empty, it is in a horizontal position; but when the pre-weighed retarder is placed in this pan it tilts downward and through a rope and pulley arrangement raises and releases the first mentioned retainer bar, and thus unlocks the dump lever.

Paper sacks (100 lb.) are very popular on West Coast

When the main hopper is dumped, a



One of the kettles in the Blue Diamond Co. plant with its extension top

short chain attached to the dumping handle draws the retarder hopper down until it is almost in a vertical position so that the retarder slides into the main hopper with the stucco. On raising the main hopper dump lever the retarder pan is raised to its original position by the same short pieces of chain. By using this simple device it is impossible to leave the retarder out of any batch of stucco or make it possible to put in a double charge of retarder. It is of rugged construction, fool-proof and certainly is a device that anyone who has two or more ingredients to mix could well afford to study.

Stucco hopper with retarder safety device at Blue Diamond Co. plant

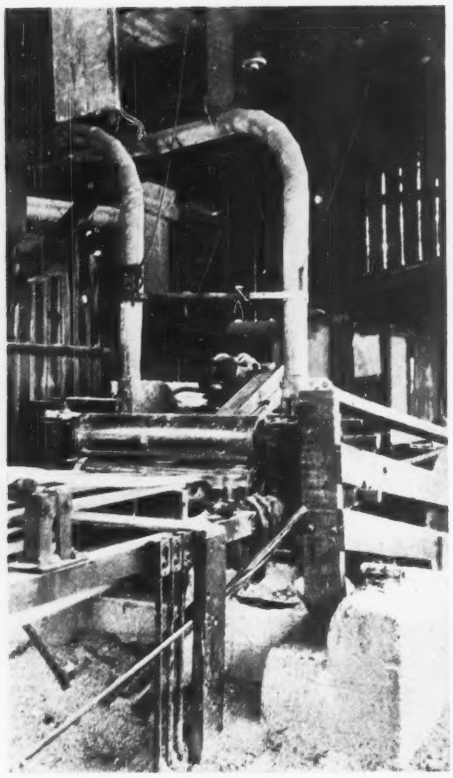
Type of tile machine used at the Blue Diamond Co.

The company also has a separate plant for preparing accoustical plasters as well as colored stuccos, and in addition operates a semi-mechanical tile plant. The old automatic machine has been abandoned and in replacing it, G. Bradley, production manager for the company, has designed a simple and economical tile machine consisting of ten horizontal molds, each capable of making three tiles, all mounted on

Take-off belt at the Klinchlath plant

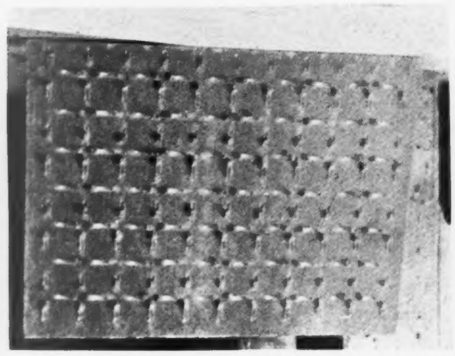
a circular revolving table. As the molds pass under the mixer and are filled the rotation of the table carries them away. The rotation is so timed that when the gypsum has set the cores are removed by hand, and the mold frames re-assembled to again pass under the machine mixer; 2400 tile per day of 8 hours can be made with this machine.

The tile during the summer can be air-dried, if desired, or kiln-dried in a tunnel dryer. The wet tile are simply passed



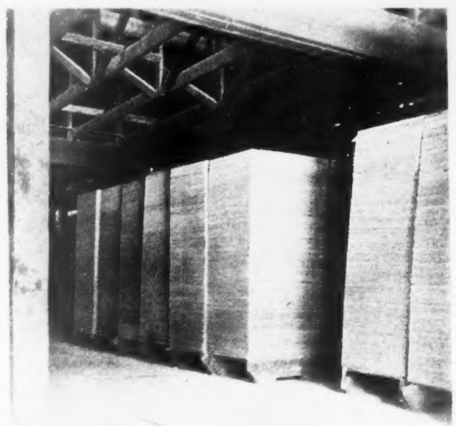
Cut-off rolls in Klinchlath Co.'s plaster board plant

through the tunnel over industrial tracks. The kiln is gas-fired, with a No. 3 Sturtevant fan driven by a 25-hp. motor for air circulation. There is nothing very elaborate about this kiln, in fact its walls are made of tile; it is directly on the ground, and only of sufficient height to allow the car and load of wet tile to pass through.

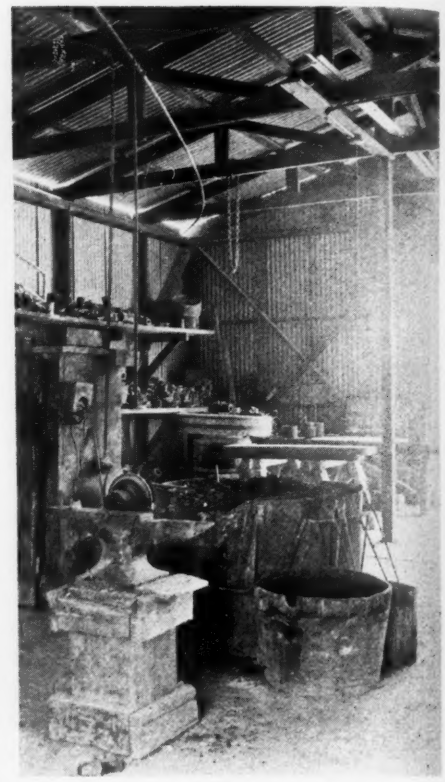


Plaster board with irregular surface to insure bonding of brown coat

At 54th and Alameda St., Los Angeles, the company operates a wall-board plant that it recently took over from the Klinch-Lath Co., and delivers stucco to that plant in its own trucks. The equipment was de-



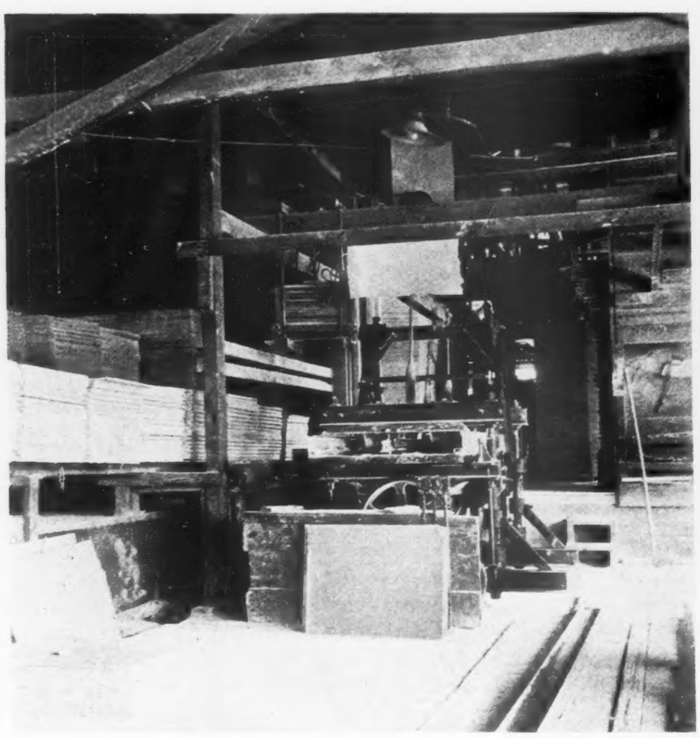
Plaster board on skids in warehouse of Klinchlath Co., Los Angeles, Calif.



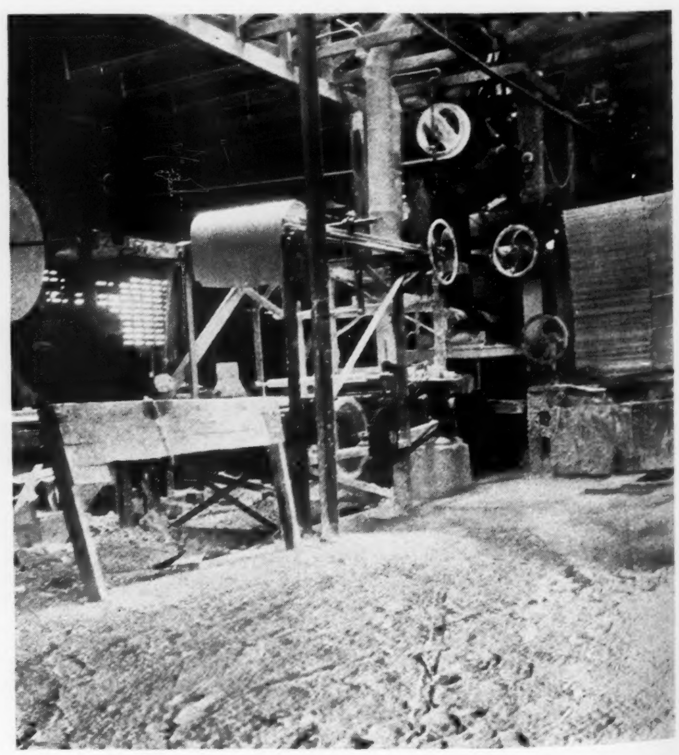
Burr stones are dressed with compressed air tools in this shop at Blue Diamond Co.

signed under the direction of Joseph Strand, now president of the company operating under the name of Mutual Income Properties, Inc., 3005 E. 25th St.

This plant is confined to the production of plaster-board made in sections of 28 by 32 in. and 16 by 48 in. and in standard thick-



Mcchine used for cutting grooves in outer face of wallboard



Mixing and feed end of plaster board plant of Klinchlath Co.

nesses. The board is simply wall-board, which after setting and hardening is passed through a machine that cuts slots over one face, both vertically and horizontally, leaving a rather jagged edge so that this groove acts as a bond for the superimposed finish or brown plaster coat that is applied on the job. The plaster is mixed in a tube through which runs a series of paddles resembling a pug mill or log washer but smaller. Water is introduced from a series of pipe jets along the top of the mixer. The wet plaster falls to a 400-ft. long by 36-in. wide balata type, "Golden Gate," carrier belt, and past the two trimmer saws at the discharge end. The saws trim to the proper width and are cut to the desired length by a roll device with a single row of projecting teeth, that are parallel to the axis of the roll. As this roll turns on its axis the wall-board is perforated in a straight line, with each revolution, cutting the board with a neat edge.

Plant of the old Klinchlath Co. now operated by the Blue Diamond Co.

Temporary kilns used for drying gypsum tile at plant of Blue Diamond Co.

The boards are placed by hand in steel racks running on industrial tracks through tunnel driers, that have a circulating fan so located that part of the circulating air is bypassed to the atmosphere through a vent, the size of the opening in the vent being controlled through gates by the operator.

The plaster-board plant has a capacity of 50,000 sq. ft. per day. R. H. James is superintendent of the plaster mill and Ed. Costello, foreman of the plaster-board plant.

California Stucco Products Co.

No description is necessary of "California Stucco" because the California Stucco Products Co.'s rapid growth and extension of operation into practically all of the larger eastern cities has made its colored interior and exterior stuccos well known; and while the name stucco implies, especially to the gypsum industry, the use of gypsum as a base, however that is not necessarily the case here, although some gypsum and Keene's cement are used in making some of that company's products.

New plant and offices of the California Stucco Products Co.

Geo. H. Buttress, who formerly operated a wall-board plant in southern California under the name of the Buttress Wall-Board Co., recently designed and built a new plaster-lath plant for the California Stucco Products Co., and that material is now being marketed in this locality.

One of the problems of the plasterer is to have a backing that will be free from any movement or expansion and will be free from deterioration. Wood lath is be-

"Riblath" in warehouse of California Stucco Products Co.

coming gradually of lower grade, with a tendency to take up the moisture from the green plaster, resulting in a swelling movement with a later contraction due to the drying out of the wood lath. Metal lath, on the other hand, is costly and to overcome these difficulties the California Stucco Products Co. has developed and is extending the use of gypsum lath to overcome some of the difficulties enumerated.

The product known as "Riblath" consists of flexible, moisture-proof sheets of felt carrying separate, reinforced, dove-

tailed ribs. These sheets are 12 in. wide by 48 in. long, for use on studding, 16 in. centers. When applied the sheets are staggered so that no vertical joints will be greater than 12 in. long in any one place. The felt, forming the sheets, makes them sufficiently flexible to take up any movement in the wood studding and prevents this movement from being passed on to the finished plaster surface.

A. O. Malone, president of the California Stucco Products Co., demonstrating the new product

The ribs of each lath are made dovetailed so as to secure a positive mechanical bond, and the flexibility permits the lath to be easily applied to coves and arched ceilings.

The ribs of the lath are made up of gypsum stucco to which about 6% of filler has been added. The plant has a capacity of 4000 sq. yd. per day. The new offices and plant of the company are at 6135 South Central Ave., Los Angeles, Calif. A. O. Malone is president.

(To be continued)

Monolith Midwest Architectural Contest Winners

AFTER five days of deliberation, nine judges meeting in Denver, Colo., announced on November 8 the winners in the "Small House Competition" sponsored by the Midwest chapters of the American Institute of Architects for the Monolith Portland Midwest Co., with Richard S. Requa, A. I. A. of San Diego acting as professional advisor. From an array of 337 beautiful architectural designs, the following winners were announced:

Walter L. Moody, Los Angeles, first prize; H. Roy Kelley, Los Angeles, second prize; Arthur H. Hutchason, Los Angeles, third prize; with additional awards going to Kurt Steinbach, Detroit; Livingston H. Elder, Billings, Mont.; Edward W. Kress, San Francisco; Otho McCrackin, Hutchinson, Kan.; Harold H. Weeks, San Francisco; Norman L. Low, Rivera, Calif.; Florence Wright, Santa Monica; J. Robert Harris, Hollywood; T. Y. Hewlett and H. M. Coy, Toledo, Ohio, and Yandell W. Nibecker, Los Angeles.

A gypsum lath that can be used to replace metal lath

In addition to the home designs, 52 educational articles also were received which have not yet been judged.

Mr. Moody, as winner over all, will receive a three months' trip abroad, first class, with all expenses paid and $500 in cash for incidentals. Mr. Kelley's award is a two months' trip abroad with all expenses paid and $300 in cash. Mr. Hutchason may take a three weeks' trip anywhere in the United States with transportation and hotel expenses paid and $150 in cash. Other winners received special prizes, one of $100 and 14 of $50, accompanied by a copy of Mr. Requa's sumptuous book, "Old World Inspiration for American Architecture."—*Monolith Mixer.*

International Asbestos-Cement Products Cartel Formed

AN international cartel of asbestos-cement products has been formed as the result of the strong position of the Turner-Bell amalgamation. The objects of this cartel are: the exchange of technical knowledge, establishment in Switzerland of an institute of research for the entire industry, foundation of new factories in neutral countries, organization of the export business, standardization of quality and minimizing unnecessary variety in the product and mutual assistance in securing the necessary raw materials on the best terms.

The directors of Turner and Newell, Ltd., in their report state the arrangement includes the principal manufacturers of asbestos-cement building products in Czechoslovakia, Belgium, France, Holland, Austria, Italy, Hungary, Spain, Switzerland and Germany. The proposed amalgamation with the Rhodesian and General Asbestos Corp. will rationalize raw asbestos production in Africa in much the same degree as that which the company has achieved at home. Net trading profits were £904,633, the net balance being £824,798 (£592,224), and the balance available is £827,954 (£602,562). A final dividend of 15% on the ordinary shares, making 17½% (15%), is recommended.

Riblath can be folded to conform to structural needs

The capital is to be increased to £6,850,000 by the creation of 1,552,071 £1 shares. —*Chemistry and Industry* (England).

Gypsum Resources of New York

THE University of the State of New York has published Bulletin No. 283, by D. H. Newland, state geologist, entitled, "The Gypsum Resources and Gypsum Industry of New York." Development of the gypsum industry in New York since 1918 has taken such rapid strides both in tonnage and value of material that the need of a complete survey of the state's resources was apparent and the 188 page book is intended to fulfill the need.

The book gives a history of the New York gypsum industry, statistics of production and imports of gypsum. The composition and properties of both gypsum and anhydrite, their origin, occurrence, use and technology are discussed. The general geology of the New York deposits are included along with brief descriptions of the various operated and non-operated deposits within that state. The book is well illustrated and should be included in every gypsum technologist's library.

Rock Products Plants—Details of Design and Equipment

Part I—Rotary Screen Drives

By Hugo W. Weimer
Consulting Engineer, Milwaukee, Wis.

NOT only must each unit in a plant be efficient when operating, but likewise the method by which it is driven must be of proper design to avoid unnecessary expense in operation or loss of time by shut-downs. To describe and illustrate the many different ways a simple unit such as the rotary screen may be driven, is the express purpose of this article.

When the industry was in its infancy, no special thought was required because the majority of the plants had as a power unit a steam engine driving a main countershaft and thence by belts or hemp ropes to secondary countershafts if necessary, before applying the power to the various units. Modern practice eliminates the old inefficient manner of applying power and the tendency is to have individual power units with some method of driving to make it as compact as possible.

Typical Modern Drives

The individual motor drive has proven itself to be the best and most economical method, hence many older plants would do well to carefully study their present equipment for the possibilities of installing, if necessary, some up-to-date driving arrangements to eliminate antiquated methods. The changes should assist in reducing the costs, so essential at all times, but more so during this period. Fig. 1 illustrates a method of driving a rotary screen by means of belts from a motor. For an average screen the drive shaft operates at about 50 r.p.m., which makes it impossible to belt direct from the motor to the screen, it being necessary to interpose a jack shaft which will permit of two reductions in speed. Assuming that the screen requires 12 hp. and that the drive pulley is a 54-in. by 10-in. at 50 r.p.m., a 15-hp. motor is selected as having sufficient reserve. Bearing in mind that the higher speed motors are less expensive than the slow speed, we will work out this drive with the highest speed motor consistent with good practice and also remember that a 6 to 1 reduction by means of one belt should not be exceeded if possible. Other things to remember are that the belt speed should at no time exceed 5000 f.p.m. and it is better to keep this speed under 4000 f.p.m. The average belt for these drives would be 5-ply, the smallest diameter of pulley for this thickness of belt would be 8 in. and better practice would be to use none less than 10 in. or 12 in. diameter. A good speed for the jack shaft is anywhere between 200 r.p.m. and 250 r.p.m. Figuring the drive from the screen by multiplying the diameter of the pulley on the screen (54-in.) by the speed (50 r.p.m.), and then dividing by a diameter of pulley that is considered suitable (12-in.) gives a speed for the jack shaft of 220 r.p.m.

Determining Belt Sizes

Having determined the speed of the jack shaft and remembering the maximum ratio of 6 to 1, the maximum motor speed of a standard motor for this purpose is 1200 r.p.m. By referring to a motor book we find that a 15-hp. motor 1200 r.p.m. has a pulley 8 in. in diameter. Multiplying the full load speed of the motor (1150 r.p.m.) by the diameter of the motor pulley (8 in.) and dividing by the speed of the jack shaft (220 r.p.m.) gives 42 in., the diameter of the motor driven pulley on the jack shaft. Since the motor pulley is 7-in. face, a 6-in.

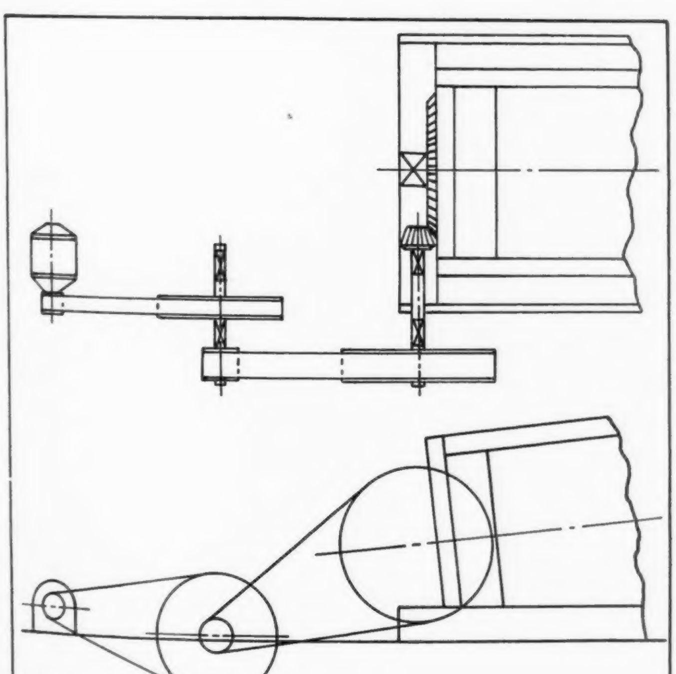


Fig. 1. All-belt drive of screen drive

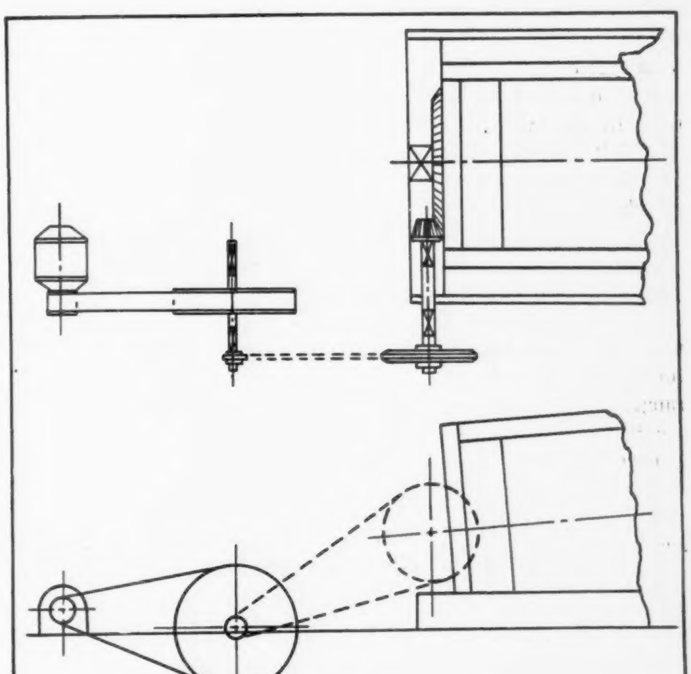


Fig. 2. Belt and chain drive for second reduction

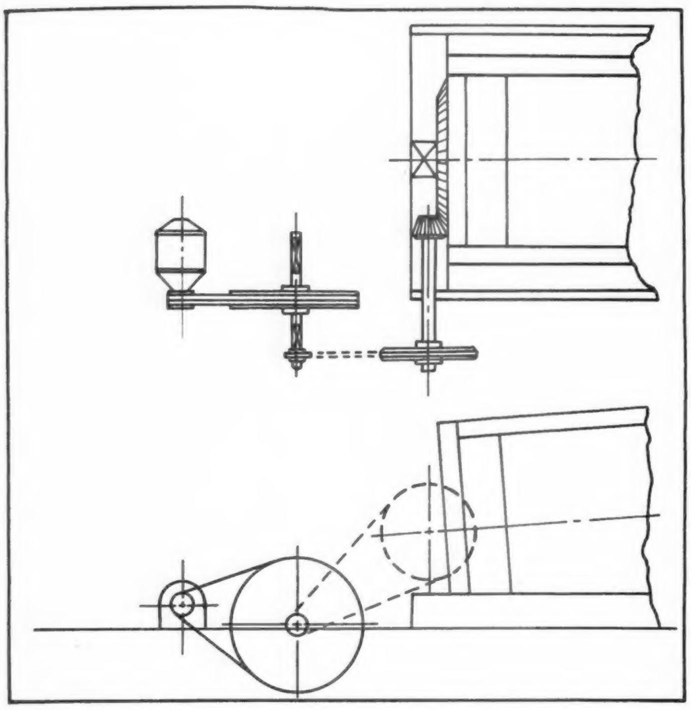


Fig. 3. V-belt and chain drive

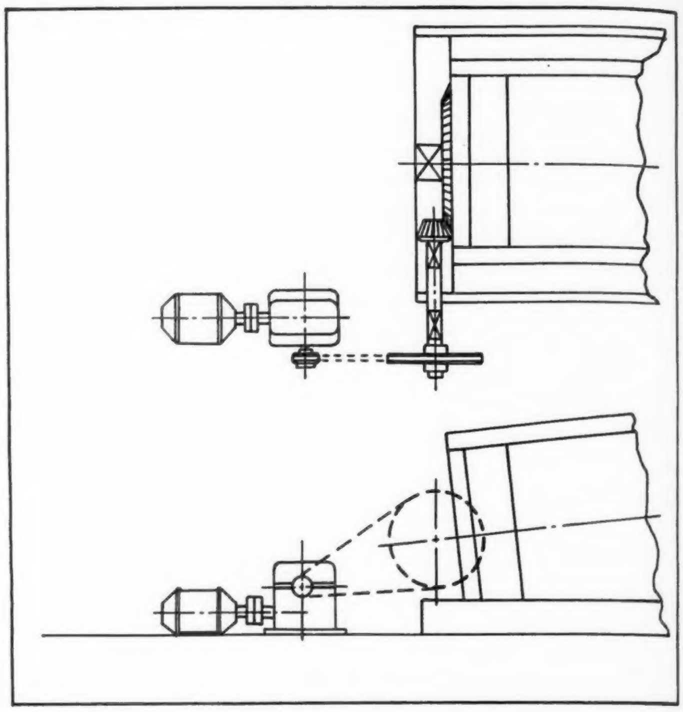


Fig. 7. Right-angled drive—worm gear reducer and chain

belt is required for use with this drive.

Having determined the details of this driving arrangement thus far, it is further necessary to know at what centers these drives can be placed. Without using an intricate formula to determine this, assume that the minimum centers for drives of this kind to be about twice the diameter of each of the pulleys. By this method, the motor belt should be 9 ft. center and the screen belt on 11 ft. centers. The belting should be some good rubber belt, an economical and practical material for drives of this type, because there is no danger of the belts being subjected to oil or extreme heat, which conditions are detrimental to rubber belting. This type of drive using two belts is in successful operation in many plants, but the necessity of keeping two belts tight to prevent belt slippage which so often happens and the space required does not make this an ideal drive.

Fig. 2 shows a driving arrangement having a 1200 r.p.m. motor, with motor, belt, jack shaft and bearings the same as Fig. 1, but using a chain drive for the second reduction. The same ratio of reduction is used for both drives as before. By using this arrangement it is only necessary to take up on the motor belt, because the chain, after it is once installed, does not require any take up. With the present design of chain suitable for this purpose (and this does not mean the old detachment chain) it is good practice to use a chain on this second reduction because of the slow speed. The ordinary chain used for this purpose is suitable for a speed up to 600 f.p.m. The smaller or drive sprocket should not be made too small in diameter, a good minimum being about 10 in., which figure with our jack speed would give a chain speed of about 575 f.p.m., which is within the limit. Chain catalogs give in most cases the maximum permissible speed as well as the maximum working load. For our example the working load is obtained by multiplying 33000 ft. lb. by 15 hp. and dividing the result by the chain speed of 575 f.p.m. This gives 860 lb.

It is best to choose a chain having at least twice the working load of the requirements and by referring to a catalog which

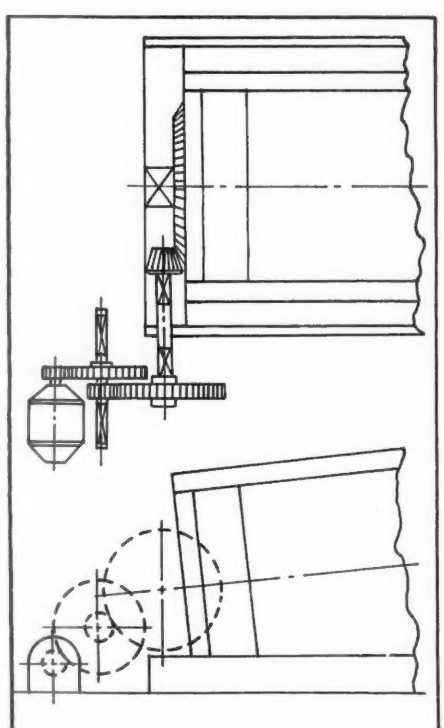


Fig. 4. Open-gear drive

shows a good type of steel chain for this purpose, a standard size which has a rated maximum working load of 2750 is found to be suitable. Sprockets listed for this chain show an 11-tooth sprocket with a pitch diameter of about 9 in. to answer our purposes. To obtain the number of teeth for the driving sprocket multiply 11 teeth by 220 r.p.m. and divide by 50 r.p.m.; this gives a result of 49 teeth for the driven sprocket, or about 40 in. pitch diameter and a good size to use. Chain drives of this kind may have comparatively short centers, which roughly may be assumed at about equal to the diameter of both sprockets, or about 4 ft. centers. This type of drive is an improvement over Fig. 1 and will give quite satisfactory results.

V-Belt Drives

Fig. 3 shows a drive which consists of two reductions similar to those previously described and uses for its second reduction the same chain arrangement as for Fig. 2, but makes use of the modern and efficient V-belt for the drive from the motor to the jack shaft. This V-belt drive eliminates the slippage and makes a compact arrangement, not taking near as much space as the other belt drive. The V-belt type of drive which is produced by various manufacturers is in many respects an ideal arrangement because very short centers are permissible and it is not subject to the extreme expansion and contraction due to weather conditions as the ordinary belt.

V-belts by no means are a cure-all for transmission troubles and should only be used when properly applied to a driving problem. The maximum ratio of reduction is about 7 to 1. For our drive, using the

same motor and jack shaft as before, divide 1150 by 220 to get the ratio of reduction or about 5¼ to 1, which is satisfactory. The center distance figure for this V-belt drive will vary from about 25 in. to 40 in., depending on what size of V-belt is chosen. With a V-belt of about 1⅛ in. wide there may be 8 belts required and the sheaves would be about 6 in. and 32 in. diameter. If a belt ⅞ in. wide is used possibly three belts would be required and the sheaves would be 9 in.

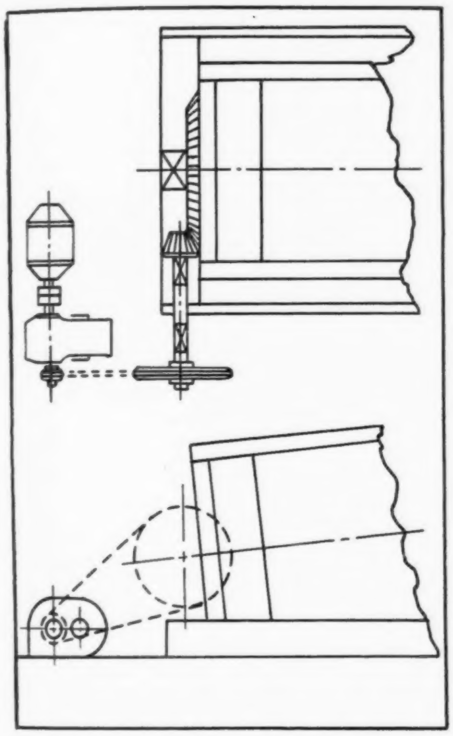


Fig. 5. Combination of spur gear reducer and chain drive

and 48 in. diameter. V-belts have about the same speed limits, 5000 f.p.m., as other belting. For our problem the speed would not exceed 2700 f.p.m., even though we used the larger diameter drive sprocket. This combination of V-belt and chain drive is very popular and is giving good results in many installations.

Open-Gear Drive

Fig. 4 shows a method of driving this screen by means of two sets of spur gears direct from the motor to the screen. For this drive the motor speed should be not over 900 r.p.m. The motor or high speed gears must have cut teeth and the pinion for this set should be made of some composition material eliminating as much noise as possible. The slow speed or secondary reduction gears may have cast teeth. While this drive is a compact arrangement it is not to be recommended because of the excessive vibration which is detrimental not only to the supporting structure, but to the equipment as well. Furthermore, it is a noisy drive and the maintenance cost is rather high as compared to other drives.

Use of Speed Reducers

A combination spur gear reducer and chain drive arrangement is shown in Fig. 5. Great progress has been made in the design and construction of all types of gear reducers and this arrangement based on using the same chain drive as in Fig. 3 would permit the use of an 1800 r.p.m. motor, which would mean a reduction of about 8 to 1 for this reducer, a figure lower than the limit of reduction for a spur gear reducer. For this arrangement the motor and reducer should be mounted on a common bed plate having the motor direct-connected to the reducer by means of a coupling.

A spur gear reducer may also be direct-connected to the screen drive shaft as shown in Fig. 6. By using an 1800 r.p.m. motor and 50 r.p.m. for the screen shafts, a reduction of 36 to 1 is obtained, which is also within the limits of a spur gear reducer.

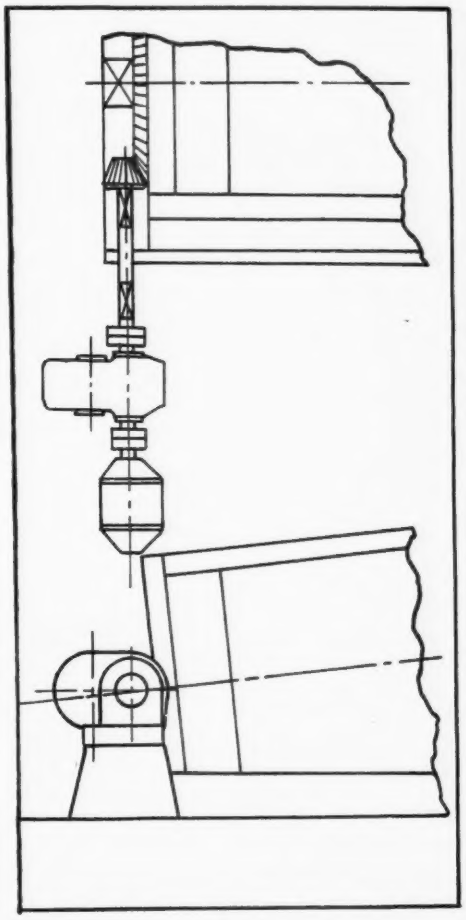


Fig. 6. Direct drive through spur-gear reducer

In this case the motor and reducer should be mounted on a common bed plate as in Fig. 5. A good flexible coupling should be used for the connection between the reducer and screen shaft.

Fig. 7 is very similar in design to Fig. 5 and Fig. 8 similar to Fig. 6, excepting that a worm gear reducer is used in place of a spur gear reducer. Worm gear reducers are also a very efficient reduction unit suitable for many drives and if the proper size is chosen will give good results.

There is but litle difference in the cost of the equipment for the first four drives illustrated; the next highest in price are shown in Figs. 5 and 7 and the highest priced in Figs. 6 and 8. Exact cost figures are not possible. The most suitable drive for a respective installation depends entirely on conditions because many installations which operate only a short period during each year

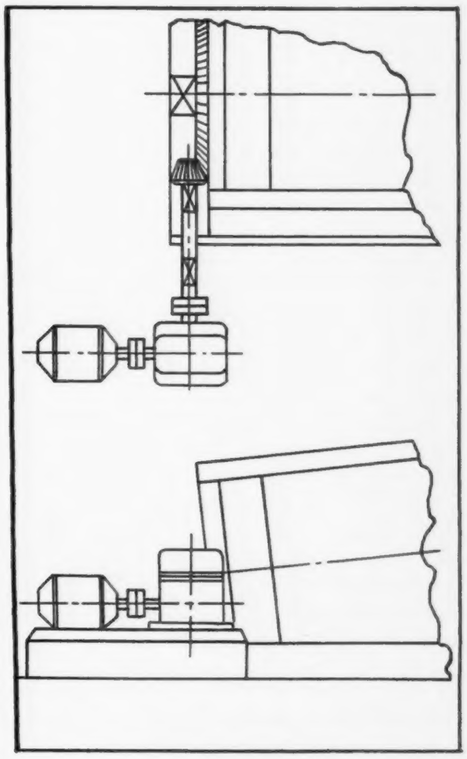


Fig. 8. Right-angled drive—direct through worm gear reducer

do not warrant the higher priced drives. In any event a good drive can be installed at no greater cost than some drives which are a continuous source of trouble.

(To be continued)

Diesel Engine Installations

According to a bulletin issued by the Diesel Engine Manufacturers Association, the largest Diesel engines manufactured in America are of 4000 hp. and installed in several vessels operated by the United States Shipping Board. Diesel engines of 15,000 hp. are in service in Europe. An interesting installation was made in 1929 at the power plant of the Moffet tunnel, East Portal, Colo., about 10,000 ft. above sea level, where a 580 hp. Diesel was installed. The largest industrial user of Diesel engines in the United States is the Phelps-Dodge Corp., which uses approximately 40,000 hp., all of one design. Another company, the Commerce Mining and Royalty Co. at Cardin, Okla., operates Diesels generating 10,750 hp. in one plant.

A Modern Idea in Gravel Plants Developed for Results

New Plant of the Fort Worth Sand and Gravel Co., Fort Worth, Texas, Makes Ideally Graded Sand and Gravel

By Jean H. Knox
Engineer-Consultant, Dallas, Texas

TWO MONTHS ago a small group of men, engineers, contractors, plant owners, watched a long conveyor system move shiny windrows of clean sand and gravel to loading bins, thence chuted to cars and trucks for shipment.

Samples of the sand and of the gravel were taken from the loading chutes and run through physical analysis tests and comparisons of the results made with specifications written some time previously covering grading and sizes of each class of material. A check revealed less than the 5% tolerance for percentages called for, ranging in sizes from No. 100 mesh sieve to ⅜-in. for sand and ⅜-in. to 2½-in. for gravel. The event was interesting in that this was the first time in the Southwest that exact grading of sizes and percentages of concrete aggregates had been attempted on any scale. And on such a large commercial scale as is possible at this sand and gravel plant marks a radical change from old haphazard methods.

This new plant of the Ft. Worth Sand and Gravel Co. is located 8½ miles from the city of Ft. Worth, Tex., on the company's own private railroad.

Bold Departures from Old Standards

While each essential feature and all equipment of the new plant has been proven in use in thousands of sand and gravel plants throughout the country yet the bold departures from old standards will merit universal approval. A description of these features will suffice to show their usefulness and the simplicity and success of operation.

The accompany illustration shows a panoramic elevation of the plant. A mile-long hump track takes care of 100-ton, center-dump ballast cars, which travel over the receiving hopper pit by gravity. The receiving hopper is 36 ft. long and 22 ft. deep with a 250-ton per hour automatic plate feeder discharging pit-run gravel to a 30-in. 200-ft. conveyor belt, which discharges directly into a sluiceway to a 60-in. diameter Telsmith scrubber screen of the usual type, having an 8-ft. scrubber chamber and 12-ft. lengths of two-jacket screens, the inner having ⅜-in. perforations and the outer ⅛-in. square mesh wire cloth.

Some 1400 g.p.m. of water is sprayed through the screen to wash and rinse the small amount of soft clay from the sand and gravel particles. Two 125-ton per hour sand, drag-type tanks receive the sand below ⅛-in. square mesh, further washing it and dewatering by drags which lift the sand from the water in the tanks to discharge on to a 24-in. belt conveyor leading to top of the screening and storage section of the plant. Adjustable wiers at the lower or waste water and silt end of tanks serve to grade the sand fines by up or down adjustment of the wier board, allowing a satisfactory grading of sand in a very simple manner.

Grading Concrete Sand Important

Careful grading of sand is highly important since our present methods used in concrete control tend to prove that the best quality and grading of sand is not only economical but necessary to insure uniformity and quality in concrete mixtures.

The gravel over ⅛-in. and up discharges from the scrubber screen to a special dewatering device where excess surface moisture is given time to drop away from the gravel particles before being discharged to the belt conveyor leading to the screening and storage section. This gravel dewatering device is a perforated, slow-revolving cylinder set at right angles to the scrubber screen. The gravel as it enters this cylinder is almost at rest, giving time for excess water to drain off, while the cylinder slowly lifts the gravel to a point where it discharges to the conveyor belt.

Twin 24-in. conveyor belts carry the sand and gravel separately to the screening section 65 ft. above the ground. The screening section is mounted on a structural steel skeleton frame 750 ft. long and 85 ft. from base of foundations to overall height.

New sand and gravel plant of the Fort Worth Sand and Gravel Co., Ft. Worth, Tex. The unusual

Screening and Stock-Piling

The screening section is simple and effective, being a series of bays in which are mounted at the top stationary inclined square-mesh manganese-steel screens, discharging over 4x7-ft. Leahy "No-Blind" type of vibrating screen. The vibrating screens are suspended by rods from above, which pass through coil springs so that the weight of each screen comes on the coil springs. Turn buckles are used to regulate the slope of the screen surface. The problem of vibration in plant frame has been a serious one to many producers, however in this instance the result has been very satisfactory, in so much as these vibrating screens with the construction used have proven to be self-contained, and the almost imperceptible vibration transmitted to the structural plant frame is negligible.

The sand below ⅛-in., after traveling to the top of the plant is discharged to storage pile under the first bay at right. The gravel passing each set of screens in each bay is carried by belt conveyor to the top of the next bay section, where it is separated again to size, and so on to the far end of screening section. From each screen the over-size retained drops to the storage pile below. Oversize gravel above 2½-in. at present has a good market to railroads as ballast so none is crushed to smaller sizes at present. The commercial screened sizes to the storage piles are 2½-in. to 1½-in., 1½-in. to ¾-in., ¾-in. to ½-in., ½-in. to ¼-in. and ¼-in. to No. 8.

Another ingenious device merits our attention. It was found that two of the sizes of gravel dropping from the screens above to storage piles below suffered considerable shattering and segregation by such a long drop, so a square section wooden frame was made extending from screen discharge to ground, having close-set, inclined baffle boards so arranged that the pebbles or gravel particles traveled through in an undulating stream striking the storage pile below with little force and building up storage without the usual condition so often found in stock piles of gravel of a cone of finer particles in the center with coarse particles to the outside. With the device here used the stock pile is uniform throughout (at center of photograph).

It is to be noted that the sand and gravel are washed thoroughly in the scrubber section, freeing the particles from clay or foreign elements, then passing through the dewatering device before reaching the vibrating sizing screens. This method places the materials in stock piles for shipment in a free and almost dry condition, the loss in water weight thus being automatically deducted from the freight and material cost to the contractor.

The item of cost to the purchaser for moisture in the aggregates for the bulk of sand and gravel shipments by rail runs to enormous sums. This plant eliminates such cost to large degree.

Recovery of Storage and Shipment

Parallel with the axis of the plant and running underneath the storage piles is a 7x7-ft., reinforced-concrete tunnel with cross tunnels at right angles to the main tunnel, having manhole gates in the top at 10-ft. intervals underneath the piles of materials. Conveyor belts in the cross tunnels discharge to a 30-in. conveyor belt, 900 ft. center to center in the main tunnel, leading out and up to a rinsing screen before being conveyed to loading-out bins. This rinsing screen is a 48-in. diameter, Telsmith type, with needle valve sprays using 400 g.p.m. of water to remove any dust coatings on gravel, which may have been accumulated in stock piles or handling.

Traveling hoppers on tracks, and operating in the cross tunnels over the conveyor belt, are set under bin gates for those sizes of gravel or sand required. These hoppers are so regulated that each will allow only the desired percentage of that particular size of gravel to flow on to the conveyor belt. The desired percentage of sizes ¼ to ½-in., ½ to ¾-in., ¾ to 1½-in., 1½ to 2½-in., or any intermediate range may be fed to the main loading belt.

The loading-out bins (seen at extreme left of photograph) are sufficiently elevated to discharge to loading bins below for truck service and to railroad cars on loading trucks by means of swinging chutes. These swinging chutes oscillate slowly from side to side of cars thus insuring uniform loading without segregation of the pebbles.

The sand, of any grading desired, is loaded out in the same way as the gravel except it by-passes the rinsing screen and contains a minimum of moisture when loaded to cars for shipment.

The loading out bins are of sufficient capacity that no delays are experienced on account of conveying from stock.

Roller Bearings Extensively Used

Every moving part of the structural equipment is mounted on roller bearings, and more than ordinary care was taken to insure proper construction and alignment throughout. The entire operation is electrically equipped, using 24 individual motors of a total of 269 hp. capacity; however, because of the accuracy of balance and alignment the actual power used is far below the rated capacity, allowing a pleasing reduction for the maximum demand rate charged. Dual-control, switchboard rooms are located, one each in the receiving and loading-out sections of the plant. Automatic stop and start switches control each motor for each operation, with signal lighting boards mounted in the control rooms and in the tunnel ways, thus any or all parts of the entire plant may be controlled by one operator and inspector.

Electrically-operated, scale weight hoppers are proposed for later installation, which will provide a maximum of accuracy in proportioning amounts of different sizes of

Screening section shown here comprises a battery of vibrating screens mounted on a series of bays

aggregates required for any grading by weight measurement.

The arrangement for lighting for night operations is elaborate and efficient, the flood lights and reflectors being so located that no shadows obstruct the vision of inspector at any points. The storage area is raised above the surrounding terrain and adequately tile drained.

Elastic Capacities

Ground storage reached by the tunnel system for gravity feed to conveyors is approximately 200,000 tons or 2000 cars of 100-ton capacity.

The loading-out capacity of the plant at present is 5400 tons per day of 24 hours. The structural frame, power and rail facilities have been so designed that the separating and operating parts may be increased 100%. The layout of this plant with its large storage and loading facilities are obvious advantages to all experienced operators. One hundred cars of materials may be shipped daily for a considerable period of time without the necessity of operating the gravel pits nor the production end of the plant. Another distinct advantage to this company comes from the condition that the company sells large quantities of pit-run gravel and ballast. It is common to have 50 ballast cars set in one day for loading and the next day receive only 10 cars.

It is necessary to provide equipment and crews at the pits for maximum loading; therefore expenses are practically the same for 10 or for 50 cars loaded.

On those days when pit loading for pit-run or ballast is less than capacity the equipment and crews now operate to capacity, delivering the pit-run gravel to the washing and screening plant at the rate of 10 to 40 cars daily without adding extra expense to the average daily operating charge.

Type of Deposit

To those unfamiliar with the gravel deposits along the Trinity Valley, they lay in shallow deposits averaging 12 to 20 ft. in depth, deposited on a clay or shale sub-base, and are covered with a black alluvial soil overburden of approximately 8 ft. The gravel pebbles are calcareous and the sand under ¼ in. is about 85% silica particles. The pit-run gravel usually carries approximately 2% to 5% above 2½-in. sizes, and below this size the sand and gravel as divided on a ¼-in. sieve runs about 50% of each. Clay or silt content in the pit-run gravel averages less than 2%.

Meets All Speecifications

In view of the present methods of proportioning concrete aggregates by apparent absolute volumes, with reasonable density, workability and quality of concrete paramount issues, the products from this plant are prepared almost ideally for all practical purposes.

On a recent state highway and federal-aid project, let on a strength and minimum cement specification, aggregates from the Fort Worth Sand and Gravel Co. plant so nearly met the gradings specified by the consultant that the voids of combined sand and gravel averaged from 16% to 18% with consistent uniformity of materials. This class of aggregates furnished the contractor made possible certain definite economies with an even greater value of a pavement uniform in texture and density and a consistent high average of quality.

Personnel

The structural steel work was designed and furnished by the Fort Worth Structural Steel Co. Conveyor equipment, screens, feeders, etc., were furnished by the J. W. Bartholow Co. The Hambrick Electrical Co. did the electrical installation. R. M. Quigley, who has for many years been constantly improving his experience in the sand and gravel industry, and who has always kept abreast of new and better plants, was responsible for the general plan and layout. W. W. Hyde, construction engineer for the company and a man of wide experience in constructing gravel and rock-crushing plants, worked out many of the special details and supervised the entire construction.

The Fort Worth Sand and Gravel Co. owns and operates the 1500-ton plant at Riverside, Fort Worth, in addition to the new plant. The supply of pit-run materials comes from holdings of 3050 acres of proven gravel deposit lands lying in the Trinity Valley between the cities of Ft. Worth and Dallas. It owns 12 miles of standard-gage railroad, using five 100-ton locomotives, with seven dragline machines in operation, the larger of which is of 5-cu. yd. drag bucket capacity. The company has rail terminal facilities in Ft. Worth, which permits of rapid transportation over an unusually wide territory within practical freight-rate limits.

The paid-up capital is $1,100,000. The executives of the company are: H. P. Bonner, president; J. O. Hart, vice-president; R. M. Quigley, treasurer, and T. E. Popplewell, secretary. The offices of the company is the sixth floor of the Electric Building, Fort Worth, Tex.

Progress in Promoting Credit Practices in Construction Industry

PROGRESS TOWARD the stabilization of credit practices in the construction industry has been the oustanding development of 1929, according to George B. Walbridge, general manager pro tem of the Associated General Contractors of America. To finally eliminate loose credit procedure will be one of the major objectives of the contractors' organization in 1930, it is claimed. The progress made during the past year will be reviewed at the annual convention of the assocation which opens in New Orleans, January 20. Plans for the establishment of additional credit bureaus will be laid at that time.

The extension of automatic credit to contractors has been a distinct disservice to the building public and to the responsible elements in the construction industry, states Mr. Walbridge. It has been largely to blame for the stigma of irresponsibility which has surrounded constructors, while the absence of a uniform system for the interchange of credit information has been the chief obstacle preventing the elimination of bad business and ethical practices within the industry.

Under the system which generally prevailed, both construction equipment and material concerns paid little attention to the responsibility of the contractors who applied for credit. They depended on surety bonds indirectly paid for by owners and on lien laws which held owners responsible for payment. Under these conditions building owners were frequently required to make dual payments because of the failure of irresponsible contractors to pay their bills.

These conditions were first definitely improved during the past year when credit information interchange bureaus were launched in some 30 cities in the first attempt to establish a nationally uniform procedure to enforce the collection of accounts from contractors. The program followed was worked out jointly in 1928 by organized general contractors and subcontractors. During the past year this program received the additional support of organized supply interests and equipment manufacturers and distributors.

The procedure which has been proven successful consists of setting up standard credit terms and interchanging information on those contractor buyers who become delinquent in their accounts. In this manner irresponsible contractors are unable to run from one supply house to another for additional credit, as all are provided with the same information. The result is that the interests of the owner are safeguarded before final payment is made to the contractor. Wherever established, the credit bureau system has succeeded in cutting delinquent accounts all the way from 40% to 80% of previous totals, the amount eliminated depending on the nature of the terms agreed upon as standard. This movement is said to mark the first instance in business history where a group of buyers has consistently advocated a stiffening of the terms of sale under which they purchase.

Winter Construction with "Incor"

AN INTERESTING pamphlet has been issued by the International Cement Corp., New York, on several winter construction jobs in which "Incor," high-early-strength portland cement was used. The publication gives the important factors to be observed in cold weather work.

Progress in Research and Technology of Rock Products in 1929

A Summary of Abstracts and Scientific Papers Published During 1929

JUDGING from the number and quality of investigations carried on in the rock products industry during the past year, it is safe to assume that considerable progress was made in the scientific and technologic advancement of the rock products industries. The search for better properties for the finished products, more efficient utilization of raw materials and labor has been rewarded to a degree —we have now early high strength cements, quick-setting lime plasters, plastic lime hydrates, improved gypsum products, better knowledge of the physical properties of aggregates, etc. All these result from continuous research — a research which is rapidly being extended.

Cement

There were a number of comprehensive reviews of the technical literature on cement; Ferrari (**22**, 98) brought out the important developments from 1785 to 1925 and Richarz (**12**, 94) confined his work to German research on the constitution of portland cement clinker, improvements in German cement and concrete. Kuehl (**16**, 94) in a lengthy article discussed the theories of hardening of low-limed and high-limed cements. Some catalyzers to accelerate action were in use, according to Kuehl, but no real progress has yet been made in their use. He found the lime combinations in silicate cements to be dibasic in comparison with those in alumina cements which are monobosic. Hydration of a silicate cement, Kuehl concludes, is a disintegration process resulting in the formation of $Ca(OH)_2$; when alumina cement is hydrated a synthesis of the lime compounds results with a subsequent formation of $Al(OH)_3$.

The studies on constitution of cement provided some controversy. Guttman and Gille (**24**, 108) carried out a chemical, microscopic and x-ray examination of alit and found it to consist essentially of tricalcium silicate. The data so obtained are quite useful in the preparation of high-limed or high early strength cements, for they reveal whether the lime limit has been reached in any certain cement. Opposed to these findings, Jaenecke (**26**, 96) states that the Hansen and Brownmiller x-rayograms of tricalcium silicate contain also the diagrams of CaO and $\beta 2CaO \cdot SiO_2$. Kuehl (**15**, 86) determined that alit was a series of mixtures comprising tricalcium silicate, Jaeneckeit ($8CaO \cdot Al_2O_3 \cdot 2SiO_2$) and di- and tricalcium aluminate.

> ### *Editor's Note*
>
> ***THE numbers in parentheses accompanying the condensed reports given herewith refer to the issue number and page on which more information on the subject can be found. For example,** 1, 36 **means January 5 issue, page 36, and for convenience the publication dates corresponding to the issue numbers for 1929 are given below:***

1—Jan. 5	*14—July 6*
2—Jan. 19	*15—July 20*
3—Feb. 2	*16—Aug. 3*
4—Feb. 16	*17—Aug. 17*
5—Mar. 2	*18—Aug. 31*
6—Mar. 16	*19—Sept. 14*
7—Mar. 30	*20—Sept. 28*
8—Apr. 13	*21—Oct. 12*
9—Apr. 27	*22—Oct. 26*
10—May 11	*23—Nov. 9*
11—May 25	*24—Nov. 23*
12—June 8	*25—Dec. 7*
13—June 22	*26—Dec. 21*

Further investigation of tricalcium silicate by Steele (**24**, 96) reveals it to be a mixed oxide and not a true salt; the original structure of each oxide is not retained. Mecke (**20**, 89), investigating the so-called cement "nucleus," found it to consist of stable calcium sulfoaluminate $(CaO)_3 \cdot Al_2O_3 \cdot 2CaSO_4$.

The French, according to Passow (**25**, 93), recognize no less than 12 different kinds of cements, each to be used for different purposes. Marcotte (**17**, 78) went into the details of puzzolanic cements, their manufacture, properties, etc. He described an artificial puzzolana made of gaize and portland cement clinker. Haegerman (**20**, 89) classified the natural cements as binding agents lying between hydraulic limes and natural cements.

Raw Cement Proportioning

Raw cement mixing by the four-component graphic method was discussed in detail in several foreign journals. Hess (**20**, 88) provided data to show that the hydraulic modulus of portland cement is of utmost importance in correcting the raw mix figures gained by the four-component system. Phillipsborn's (**20**, 89) spatial tetrahedron diagram for graphic four-component representation is of interest. Kuehl (**25**, 97) offered several formulas for "best" raw mix of cement, stating that others given by Jaenecke, Guttman and Gille were useful in determining "best" lime contents. Again, Jaenecke (**15**, 86), in studying the effect of the mixing relations on structural constituents found that "best" cement mixtures have a low Fe_2O_3 content and higher Al_2O_3.

Bogue described the arithmetical and graphic methods of calculating compounds now believed to be present in portland cement (**23**, 47) based on a clinker analysis. A slide-rule to accomplish the same purpose was designed by Dahl (**23**, 50). This rule is of the ordinary Mannheim type and covers the usual range of chemical analyses of portland cement except the range in which there is an excess of lime above that which is required to convert all of the silica to tricalcium silicate. The latter range, however, is covered by additional simple calculation. Drury compared the old and new methods of calculating portland cement and clinker analyses (**2**, 57), pointing out the effects produced by the iron oxide contents.

Improved Analytical Methods

Some improvements in laboratory procedure were noted, particularly the methods and apparatus described by Kuehl (**21**, 97). Ferrini (**20**, 90) proposed a modified form of the Schumann volumeter for determining the specific gravity of cement, claiming it to give greater accuracy. Better control of the raw mixes for making high early strength cements is claimed to be possible through the use of the Hart ultrafiltration method (**10**, 104) for determining the amount of silicic acid in the raw cement materials. A short, quick method of determining the iron content of raw mixes and clinker is described by Felber (**8**, 96) and another by King (**19**, 72). A German procedure for rapid determination of free lime in portland cement by volumetric methods (**20**,89) suggests treatment with HCl, and back titration with NaOH, bromthymol blue being the indicator. Rathke (**5**, 78), in discussing the Emley method, claims some errors are introduced through water in the glycerine. He suggests the use of alcoholic tartaric acid in place of the ammonium acetate solution used in Emley's procedure. A comprehensive bibliography on the subject has been prepared by Diepschlag and Mattig (**13**, 82), which deals with the presence of free lime and its causes; the methods for determination of free lime, such as methods in aqueous solution, nonaqueous mediums of solution and optical methods; investigations for determining free lime, dealing with testing of $CaCO_3$

and CaO; melting of $2CaO \cdot SiO_2$; tests with $CaO \cdot SiO_2$ and $2CaO \cdot SiO_2$; tests with clinker; testing with water without carbonic acid; microscopic testing and with the titration process with ammonia acetate.

Blank (**14**, 72) brought out that underburning, poor chemical control of raw mixes and insufficient grinding of the raw mixes were the chief contributing factors providing uncombined lime in portland cement. A detailed study on the effects of various percentages of free lime in regard to unsoundness of the cements accompanied the above. Quality of portland cement by chemical methods was proposed by Pool (**13**, 59), who indicated that a relationship exists between the 7-day tensile strength of 1:3 standard mortar briquets and the amounts of lime extracted from a cement by a definite amount of water under definite conditions.

A modification of the Lerch and Bogue method of determining free lime in portland cement is proposed by Meyers (**24**, 76). The method offering simpler apparatus and reagents, is designed to run three determinations at one time. The time is materially reduced, thus providing more extensive use in the control laboratory. King summarizes that most of the methods used at present for the determination of iron oxide in cement and correlative materials, emphasizing their disadvantages. He outlines a procedure in which none of the bothersome details, common to the other methods, are present, and which gives satisfactory and accurate results (**19**, 72).

Testing

The new Foerdereuther (**20**, 91) screening apparatus for testing determinations of finished portland cement is of interest. The new machine is primarily designed to give the finer screens a greater intensity of motion, thereby cutting down the screening time and thus obtaining greater accuracy. Some of the usual difficulties and inaccuracies encountered in test screening are discussed in this article.

One of the researches undertaken at the German Technical Institute, Berlin, deals with the influence of the chemical composition and fineness in grinding upon the water requirement of cements for cement mortars (**20**, 91). A rule for the interrelation between chemical composition, water addition and strength could not be found, but it was shown that the finest ground cement does not always give the greatest strengths and that somewhat coarser granulated cements are less damaged by greater additions of water than very finely ground cements.

Proportions of the grain sizes of pulverized cement particles have been determined in a new series of experiments (**20**, 90) at a Swedish institution. The investigators found that the hydration of different sized particles was a function of time and the compressive strengths of portland cement concrete depended greatly on the proportions of different sized cement particles, the finer sized particles being a chief contributing factor. Filossof (**23**, 93) working along the same lines found that finished cement which contained too great a percentage of fines did not give best tensile strengths. His findings indicate that cements whose granular analyses show 70% through 254-mesh are strongest.

Hydration and Hardening

Gessner (**21**, 96) compiled the researches on set of cements into one large reference. Jolibois and Chassevent (**23**, 93) after a searching investigation decided that the set of silicate cements is accompanied by the disintegration of hydrated monocalcium silicate in the water; this goes on until a concentration of 0.52 g. of CaO per liter is reached, which is an equilibrium point. As a set retarder, Killig (**15**, 87) has found that anhydrite is of little value (this in direct opposition to earlier findings by Meade and Berger). He cites Dahlgren's work which indicates that gypsum containing over 51% of anhydrite cannot be used. The action of sugar in retarding cements was studied (**22**, 99) and results show that it affects the crystal formation, producing at the same time excessive gel formation. Addition of Na_2CO_3 to the makeup water accelerates the crystal formation with a strong elimination of $CaCO_3$; the setting time of the cement is also hastened. Set of alumina cements may be retarded by addition of a colloid such as casein, gum, gelatin, albumin, etc., to the mixing water (**19**, 90), according to a British patent.

Geitlin criticizes the lack of uniformity in standard cement tests with regard to deciding strength (**13**, 43) offering recommendations for changing standard test methods which would eliminate much of the confusion.

High Early Strength Cements

Taylor in comparing the relation of quality and cost of production in portland cement (**16**, 64), offers data to prove quality may be improved without affecting volume or production costs. Durbin's patents (**10**, 106) presumably for the production of "Incor" early high strength cement are of interest. According to the inventor, normal portland cement clinker is admixed with 15% of the carbonate of lime or sufficient to saturate the silica, alumina and iron, the whole being then ground and burnt to a clinker when a retarder such as gypsum may be added if necessary or desirable, and the product ground to cement. If the silica, alumina and iron oxide are not thoroughly satisfied in their affinity for lime the process is repeated. If a portland cement clinker is found to possess a substantial quantity of free lime, such clinker can be ground and reburned in accordance with this invention to produce a good clinker without the addition of more lime being strictly necessary. Obviously more lime can be incorporated into such a clinker also, provided an excess of lime over theory is avoided.

Hasch (**20**, 89) in a critical review compared the manufacturing methods and chemical and physical properties of standard portland cement, high early strength cements and fused cements. Details of the Wennerstroem (Swedish) electrical method of preparing fused alumina cement are given briefly. Rengrade (**17**, 78) made a historical summary of the problems of manufacture and application of early high strengths. Several patents covering fabrication of high early strength cements were granted—the principal one is that of Pontoppidan which is in use in this country. This process (**19**, 91) uses a raw cement mix of 2.20 hydraulic modulus and 3.00 or over silica modulus; the mix is ground to pass a 200-mesh sieve, sintered and reground so that 95% will pass 200 mesh. Sufficient gypsum is added so that the SO_3 contents are over 2%. A German patent (**16**, 94) uses a raw mix with usual lime content and low silica (silica modulus, 1.65) with the Al_2O_3 and Fe_2O_3 present in about equal amounts. This mix is sintered and any subsequent addition of Fe_2O_3 and Al_2O_3, made in such proportions that the silica modulus remains unchanged. Berg (**20**, 90) found that manganese could replace iron to a certain extent in the preparation of early high strength cements, chiefly up to 3% for excesses raised the burning temperature to too high a degree. On analysis, it was found that the colored constituent of cement (alit) has some manganese.

Alumina and Fused Cements

Obst and Feret (**9**, 78) presented a review of alumina cement manufacturing processes, supplementing previous research on the constitution and properties of these cements. Charrin (**18**, 88) describes the use of alunite, kaolin and leucite as raw materials for alumina cements, the soluble chlorides of these minerals being recovered as byproducts. Production of alumina cements at lower temperatures than usual is claimed by several processes. Knibbs (**22**, 98) treats a mixture of bauxite and lime with steam and then calcines the mass at temperatures below melting. Bauxite and lime or limestone is clinkered at low temperatures in another patent (**25**, 92). An American process (**24**, 110) clinkers a mixture of bauxite, lime and sea salt or calcium fluoride, avoiding fusion of the mass. There are also a number of other processes which involve the use of calcareous materials and bauxite (cf. **1**, 79). Some unusual properties are claimed for a mixed cement (**8**, 97) made of alumina cement, portland

cement and admixtures such as silicic acid and salts, pumice, tufas, etc., which are used to fix the free lime as double lime compounds. Gonell, investigating the "sanding off" of alumina cements (**20, 91**) found the cause to be due to formation of $CaCO_3$ by the atmospheric CO_2 and lime.

Several processes dealt with the manufacture of fused cement without the use of electric furnaces. A German patent (**16,** 94) proposes to heat bauxite and lime in separate chambers and then combine the two in a different fusing chamber. A mixture of high-silica clay, clay marl or kaolin, slag and fluorspar is brought to fusion, according to another process (**20,** 89. Lime may be added to the fusion mass if desired. Cement made in the usual rotary kiln is preheated and projected into a reverberatory furnace where it is spread and exposed to the flame, by another patent (**26,** 99). A homogenous fusion mass of limestone, calcium chloride, fluorspar and blast furnace slag, to which gypsum is added to retard the set, is the basis of a German patent (**26,** 97).

Special Cements

Equal strength with standard portland cement but better resistance to aggressive solution is claimed for "Portlandjurament" (**7,** 100), a German product made of cement clinker and slag. Forsen (**20,** 91) grinds a mixture of portland cement, gypsum, lime and silica sand as an extender to get a cement of improved strength. A mixture of standard portland cement and finely ground acidic rocks high in alkalies such as granites, syenites, etc. (**14,** 95) makes an extra hard and dense concrete when used in usual manner. During setting the alkalies are liberated and the lime fixed with gelatinous silica, according to the inventor. Hendrickx (**26,** 99) mixes a proportionate amount of lime or limestone with the fuel to make a cement mix; the usual raw cement materials are used. Sound cements and absence of kiln rings are claimed as advantages for the process.

Molten slag, according to an American patent (**26,** 99) is carried to a second furnace where lime is added; the product is discharged and allowed to cool and disintegrate spontaneously, after which pulverized limestone is added, the mass wetted and ground and burned in the usual manner to an artificial portland cement. Attempts were made to use the Quebec ilmenite (**22,** 98) as a source of metallic iron and cement; adjustment of the acid and lime ratios in the resulting slag makes titanate cements possible. Treatment of rock phosphate in such a manner that the lime residue can be used as a cement raw material has been proposed in past years. The detrimental phosphorus in the residue can be removed from cements so made by treatment of the ground product in a special "glow" apparatus and oxidizing atmosphere (**22,** 98).

To make a low-sintered, white cement, an American inventor (**18,** 89) uses the insoluble residues of decomposed feldspar-limestone mixes, so proportioned as to give a raw cement material which is dried and calcined at low temperatures. A colored cement (**20,** 88) in which the colors are fixed fusion products is made by adding colored metallic oxides of metallic elements as chromium nickel, cobalt, copper, etc., to the raw cement mix along with an alkali phosphate and metal halogen compounds. An oil-and-waterproof cement (**22,** 98) results from the addition of chlorides of alumina, calcium, tin, iron, etc., or treatment of the cement with hydrochloric acid, according to a British patent.

Kiln Efficiencies

The kiln commission of the German Cement Manufacturers' Association made an exhaustive report (**1,** 78) on the output, fuel consumption, clinker quality, waste heat recovery, etc., based on test data obtained from four kilns over a period of years. This report was reviewed critically by Stehmann (**11,** 84), who added some data on kilns equipped with the Stehmann sealed kiln process. Sozetti (**26,** 96) calculated the thermal balance of cement kilns, giving heat values required for efficient cement burning. In discussing the heat losses in rotary kilns, the greatest, 45% of actual heat put in, was due to heat units required for evaporation of water from the slurry. Pooley used a 200-ft. rotary kiln to get his thermal data (**2,** 87) and supplemented his report by a discussion of kiln control through the use of pyrometers and gas analyses. In describing the new Daignac (France) cement mill, Steiger (**23,** 93) offered some interesting technical information regarding the efficiency of the waste heat installation, grinding mills and other equipment. Eck (**17,** 78) provided a detailed description of the Marguerre waste heat installation at the Saale cement mill, Granau, Germany. The new waste heat plant at the North American Cement Corp.'s Security, Md., mill, by which 6000 kw. is generated, was described and illustrated in detail (**26,** 53).

Pike, in a critical discussion of rotary cement kilns (**3,** 40), presented fundamentals of clinker burning and a rational method for calculating ideal fuel economy. He developed by analytical methods the heat balance of an "ideal" apparatus, pointing out that the weaknesses of present-day apparatus are emphasized by comparison, thus aiding in the development of better thermal efficiency. In a later article (**8,** 60) Pike examined the heat-transfer relations existing in the rotary kiln and derived conclusions which are useful in designing more efficient apparatus. The third article in this series by Pike (**11,** 64) used the data from the two previous articles, summing up the study with two equations which apply to all thermal problems of rotary kiln operation. These equations bring out the vital point that for maximum efficiency there is a definite linear relation between the length and diameter of the calcining zone and also of the entire kiln itself.

Blaise summed up the effects of fuel and air mixtures in burning cement clinker (**3,** 38), stating that improvement in color, strength and grindability is accomplished by use of a flame oxidizing in character. Preparation and uses of different types of fuel for cement burning, their efficiencies and some significant data on kiln operation were given by Reid (**23,** 69). Portas (**3,** 47) listed the causes of low efficiency in cement mill operations, stating that present efficiency must eventually be improved over 100% by coordinated scientific effort. The relative merits of wet- and dry-process manufacture were discussed by Blaise (**11,** 57) from the standpoint of construction costs, fuel efficiency, operation costs and quality. He concluded that the whole industry is in the process of alteration due to introduction of closed-circuit grinding, early-strength cements, slurry filtration, two-stage burning, improved dry blending systems, etc.

Improvements in Slurry Treatment

Several new methods of feeding slurry to the kilns were brought out; among these was the Fasting rotating device (**22,** 99) of various modifications, which dips into the slurry accumulated somewhat in the bottom of the rotating slurry chamber and takes up the slurry which, under the influence of the centrifugal action, is thrown off in a finely divided condition into the path of the combustion gases.

The Rigby patents (**13,** 83) cover an atomizing device for spraying the slurry into the kilns, and employ other methods and means for drying the slurry outside the kiln proper by waste-heat gases. Several designs to control amount of drying to which the atomized slurry is subjected and also to avoid formation of clinker rings are given. Installation of this process in an English cement plant was described (**25,** 70). Dyckerhoff (**20,** 89) patented a means for air agitation of slurry. Budnikoff, experimenting with chemical admixtures in slurry (**21,** 96) to cut down the moisture content found that very small amounts of sodium silicate were satisfactory. The kiln output was increased with consequent fuel economy and the clinker was more easily ground.

Kilns and Coolers

An American patent was granted on a kiln with two inclinations (**22,** 99) which permit slow travel of slurry through the first section and faster through the second. The claims advanced are fuel economy, increased capacity and elimination of clinker rings. A German kiln has an en-

larged preheating zone (**2**, 87), with a special narrowing arrangement between the clinkering and calcining zones to give higher temperature in the sintering zone. In another kiln (**18**, 89), the combustion gases in the different zones are cooled so as to check the deterioration of the metal kiln members. An automatic shaft kiln (**11**, **84**) for production of fused cements and a tunnel kiln (**11**, **84**) in which the raw cement mix is blown in with high-pressure air to a special sintering zone are among the novelties. A British patent proposes the use of a vertical kiln (**17**, 79), fired from four burners located at its bottom. The dry raw mix is sprayed in at the top and is kept in partial suspension by the hot fuel gases until it is clinkered and then falls to the bottom, where it is withdrawn by mechanical means. The waste heat is recovered.

By a special cooling arrangement, Stehmann (**3**, **110**) recovers the heat from the clinker and reuses it in the kiln. In another process, the hot clinker is passed over a series of baffles (**4**, 93), in which cold air circulates; the heated air is drawn to a recuperator and then forced to the firing end of the kiln to mix with fuel.

Two important investigations regarding the suitability and durability of various types of kiln linings were carried out. Endell (**26**, 96) determined the expansion curves of kiln refractories ranging from the siliceous to the aluminous types, and Mueller (**26**, 98) found that deterioration of all types of linings was due principally to the replacement of alkalies for different lining constituents.

Cement Grinding

In investigating "flash" set of cements, it was found that grinding with temperatures in excess of 230 deg. were mainly responsible for the phenomena. However, this extra-early set is not detrimental for the later and regular set occurs and the concrete is of usual soundness. To prevent conversion of the gypsum added to the finish grinding mill, a patent (**26**, 99) suggests the mill be water-jacketed; another on the same order places a cooler between the grinding mills (**26**, 99).

A comparison between the open-circuit grinding now used by the cement industry with closed - circuit grinding of metallurgy was made by Anable (**1**, 66). He indicated that this type of grinding would only be adopted when it could show attractive possible savings. From the theoretical standpoint, closed-circuit cement grinding, he concludes, is attractive on the widespread agreement among cement technicians that grinding all the material to a specific particle diameter is desirable and that grinding beyond this point does not result in advantages commensurate with the cost. Closed-circuit grinding appears to be the most reliable method of securing precisely this type of reduction since by the very nature of it the fineness of the coarsest particle in the finished product is accurately controlled and overgrinding to superfine or "flours" held within narrow limits, according to Anable.

The effects of aging on the grinding resistance and cementing value of clinker were studied by Bryant (**8**, 64). He found that with a given composition, degree of burning, etc., of portland cement clinker, the grinding resistance varies in direct proportion to the loss on ignition. Further, with a given composition, degree of burning, etc., of portland cement clinker a relative grinding resistance factor may be computed. A lower limed clinker, Bryant found, will lose a lesser proportion of its cementing value when subjected to aging for extended periods of time than will a higher limed clinker, both being aged under the same conditions. Blank reported a study of the grindability and quality of air-cooled and water-quenched portland cement clinkers (**19**, 50). Trampe gives in detail the changes made in the filling of several tube and compound mills (**12**, 58; **24**, 82) which resulted in increased capacity.

Cement Dust

Blank, in a study of flue dust losses and their recovery (**2**, 48) indicated the factors affecting the amounts. He states that when the collected flue dust can be so mixed with the raw mix as to be present in only a small percentage, and when this flue dust does not interfere with kiln operations or have any detrimental effect on the quality of the resulting cement it may be considered as beneficial in that it represents a saving in raw material. The Schmidt patent (**6**, 77) describes a method of returning recaptured flue dust to the kiln in the wet process of manufacture to avoid building rings or cakes at the feed end of the kiln. A slurry is made of the flue dust and allowed to stand before feeding it to the kiln.

Exposure to cement dust predisposes workers to acute bronchitis, nasal, skin, ear, eye and digestive diseases, according to a recent report (**23**, 95). Dusty conditions at a French mill were eliminated and considerable of the dust losses cut down by the installation of S. P. G. I. electrical collectors at the rock driers, grinding mills, etc. Over six tons of dust per day were recovered from the driers alone; they handle about 200 tons daily.

Storage

Type and length of storage is known to affect the properties of cement, but to what extent is the basis of Russian (**21**, 97) and German (**14**, 94) research. Haegermann (**25**, 92) found that on prolonged storage, good grades of cement retained their qualities for a long period. The initial strength is affected but not to the degree the 28-day strength declines; compressive and tensile strengths are both lowered, the former more so. Baehrner is in accordance with the above (**14**, 94) and states the set is also prolonged. Luftschitz contends that package in paper bags is detrimental to cement, causing reversion, etc.; Goslich, investigating Luftschitz's work, disagreed, stating that the results found by Luftschitz were due to the cement itself. A novel idea in packaging cement is the basis of a British patent **17**, 79); the cement is pressed into blocks and wrapped in paper.

Lime

Rossman's abstracts of American process patents (**16**, 66) for manufacturing lime, Azbe's articles on European lime-burning practices (**3**, 50) and on the rationalization of shaft kiln design (**8**, 56), by which a basis for comparison of kiln performance was developed which later was used in comparing performance (**11**, 51) of many different kilns of Europe and the United States were among the features described in Rock Products in 1929.

Moritz presented an able discussion of internally-fired, mixed-feed shaft kilns (**22**, 74), giving specific suggestions for maximim efficiency. Schaefer's critical discussion (**12**, 55) on Azbe's "Ultimos" kiln was followed by Azbe's reply (**12**, 57), wherein was pointed out the weaknesses of the Schaefer argument.

Kuehl considers fuel reaction (**20**, 88) in shaft kilns to consist chiefly of six fundamental stages by which the final product is CO. Tremmel concludes from three tests with raw mixes burned (**18**, 88) in a coke-fired automatic shaft kiln that the fuel is submitted considerably to the action of the carbonic acid gas from the limestone. A complete gasification according to stoichiometrically calculable quantities does, however, not take place and considerable quantities of fuel must be burned direct by the atmospheric oxygen. Further, if the fuel is not ground with the raw material, but is pressed in granular condition, the CO formation will be less corresponding to the smaller contact surface between the fuel and carbonic acid and that instead, due to the porosity of the fuel developing in the burning, the direct burning by the blower air or forced air is correspondingly facilitated. An efficient Silesian lime plant is described by Haelbig (**6**, 94) who also gives details of heat conservatism measures in use, fuel ratios, etc.

The automatically operated lime plant at Duesseldorf (**26**, 96) of 350-tons per day capacity obtained from shaft kilns, is of interest. This is a mixed feed operation, with fuel ratios of 17%; only 6 men are required to operate. Wolcen in a survey of lime burning (**23**, 94) goes into the economics of operation, drawing data from four types of gas-fired kilns featuring continuous draw under sealed conditions. Laeger, prominent German lime engineer, gave impressions of his recent American visit (**10**, 86) and Ludowigs

(17, 63) compared the German lime industry with the American on a basis of his visit to different plants throughout the United States. Scientific management of lime plants (11, 84) based on efficient time studies, etc., was proposed in a German article.

Special Limes

The Loomis patent for a quick-setting lime product (25, 74) involves the partial recarbonation of burned ground lime. In Harrison's process (25, 75) quick-hardening properties are obtained by the use of such admixtures as shale ash, calcium chloride or iron sulphur compounds. Another American patent (15, 87) for the same purpose uses a lime putty, "Lumnite" cement, aluminum sulphate, limestone, gypsum and sugar.

Plastic Limes

Dittlinger's process (11, 85) for plastic lime hydrates depends on mechanical and chemical treatment. The hydrate particles are processed in a device where the direction of throw is changed and an impinging particle results which is similar in size and shape to that obtained in air separating. To the hydration water a ¼% sodium thiosulfate solution at low temperature is added also. Frey claims plastic lime to result from his rotary kiln process (11, 54) for calcining ground dolomite. The dolomite is kept in the kiln for a prolonged period at fairly low temperatures.

An important American investigation was concerned with the reactions of lime and water (3, 36). Several samples were hydrated in a special apparatus designed to give effective control of operating conditions. The investigator found that in order for lime to be plastic the voids between the particles, including the voids in the aggregates, must be filled with water, and, in so far as this water in the voids is missing, plasticity is reduced; plasticity is proportional to the amount of water which the hydrate can absorb; penetration of water into the voids is greatly influenced by surface condition of particles.

Mathers and Ray (6, 60) developed the theory that plastic hydrates owe their plastic properties to their power of forming charged particles upon soaking or slaking. They showed that the charged particles hold around them a film of solution, which so lubricates the particles as to make the putty plastic or easy to spread with a trowel.

Hydraulic Limes

Hydraulic lime, according to a French patent, can be made by calcining a mixture of lime residues from sugar manufacture and clay (22, 98). Luftschitz (20, 88) grinds and calcines a mixture of lignite coal ash and limestone to make a hydraulic lime. Rotary kiln limes, containing siliceous impurities are hydraulicized (22, 98) in Germany by treating the hydrate with steam under pressure. A Texas plant is making a clinker brick (2, 51) from the lime waste from its mixed feed kilns. The lime mixed with ashes is hydrated, cinder aggregate added and the mass pressed into bricks, which are then hardened in a steam cylinder. Another process uses lime sludge (4, 93) from calcium carbide manufacture mixed with calcium chloride, the whole being boiled to separate the lime liquors.

Warner and Mount (22, 99) collaborated on a forced-draft, continuous draw shaft kiln design in which close control of reactions was permitted and better distribution of the gaseous fuel made possible. An American inventor proposes to remove the deleterious combustion products (sulphur compounds) associated with the lime from the burning process by introducing an absorption medium for these in the lower part of the kiln (14, 95). The impurities are precipitated during the course of the kiln action and removed mechanically.

Gypsum

A substantial review of American process patents (10, 66) for production of plaster of paris was made by Rossman, and Honus summarized in detail European processes for utilizing gypsum (24, 78) as a source of sulphuric acid and cements or lime. Schoch's new book on mortar compounds (11, 84) devoted several sections to gypsum binding materials, their preparations, uses and limitations. Several other processes, chiefly the de Beauregard (15, 86) which treats gypsum with superheated steam were given. Chassevant (9, 78) described the preparation of gypsum plasters in France, giving control methods and other data. Pellet made a similar review (13, 82), adding significant details regarding characteristics of various gypsum plasters. The various stages of gypsum hydration (25, 92) were discussed by Goslich, who also proposed a method of calcining gypsum in vacuo. The dehydration of hydrated gypsum (16, 94) was studied by Budnikoff in a later work; the same investigator reported on catalyzers for activating anhydrite (23, 92) to make it suitable for plaster purposes. Additions of sodium bisulphate or copper sulphate were found to be the best catalyzers. Trass admixtures of gypsum (20, 89) affect strengths, particularly the tensile strength, as in cement; the pouring and working periods are also prolonged. Williams found the expansion curve of gypsum plasters (16, 92) to drop as the temperature rose, reaching a maximum when the gypsum semi-hydrate is all in solution. The porosity and absorption power of gypsum varies directly and the strength varies inversely to the amount of mixing water added, according to findings made by Marathe (11, 84).

A new type of kettle calciner in which dehydration of gypsum is done by preheated oil circulating in a built-in tube system (18, 88) was described by Martin. As regards quality, an American patent (16, 93) proposes passing the calcined gypsum through a Raymond mill equipped with air separator; the impurities, chiefly lump uncalcined gypsum and rock, are removed in the process. Plaster can be aged artificially (18, 89) and quickly by subjecting the "first settle" material to the direct action of a water spray or steam under agitation, according to another patent.

Light Weight Gypsum Products

Rossman reviewed American process patents for making porous lightweight gypsum products (20, 74), supplementing this report with a digest of American retarder manufacturing processes (23, 55). The manufacture of gypsum products ranging from 12 to 24 lb. per cu. ft. (19, 91) was the basis of an American patent. The inventor uses varying proportions of plaster of paris, sodium bicarbonate, magnesium sodium fluoride, hydrated lime and soap bark. Another process for lightweight gypsum uses a starch solution (14, 95) made by treating starch with water, heating the mix and then adding sulphuric acid. This solution is added to the mixing water.

Synthetic Gypsum and Magnesia Products

Several processes for making synthetic gypsum were patented. One inventor uses a lime hydrate, adds excess heated water and then hot sulphuric acid, avoiding agitation so as to trap the excess water in the mass (20, 88). The mix is then carefully allowed to set in forms. Starting with magnesite, another process (22, 99) treats with ammonium sulphate; the mass is heated so as to cause the ammonium carbonate to sublime out and the magnesium sulphate leached out. The magnesium residue, principally the sulphate, is then calcined. Dolomite calcined and treated with ammonium salts to extract the lime contents, following which the residue is calcined, is proposed in one patent (22, 99). The waste liquors from the Solvay soda process can be used in place of ammonium salts, the inventor says. A process which is claimed to give an extremely dense product comprises the calcination of magnesium carbonate, sorting with subsequent grinding to 20-mesh, addition of water to allow molding to cakes, then air drying (5, 79). The cakes are then broken to 2-in. size and placed in a steel converter, where blasts of hot fuel gases and excess air play upon them. The final product is periclase, useful as an electrical insulator. By subjecting the wet gypsum mix to high pressures, the excess water is squeezed out and there is left a

hard, compact, polishable product, states an American patent (**12**, 95).

Holmes discussed dolomitic clinker as a stable basic refractory (**15**, 59), giving details of tests conducted as to proper development and uses and the possibilities of commercial scale production. A classification of the dolomite bonding materials (**22**, 98) from MgO to MgO·CaO mixtures, mixed dolomites resembling hydraulic limes and dolomite cements containing about 25% of SiO_2 and Al_2O_3 was given. An article reviewing the constants of dolomite bricks (**19**, 91) states that contents of over 6% Fe_2O_3 and 1% SiO_2 are objectionable for ordinary refractories.

Gypsum Wallboard

A number of refinements in wallboard manufacture were noted. Patents were granted for reinforcing edges (cf. **6**, 95; **11**, 85; **14**, 94; **21**, 97 and **25**, 95). A nailable edge, comprising a U-shaped member to clamp over the ordinary edge (**4**, 93), and a folded edge with a bevel (**12**, 95) were patented. Wallboard without cover sheets (**21**, 97) and a hollow-cored type (**21**, 97) made by continuous methods are among the novelties. Among other patents are those for a machine to make a tongue and grooved wallboard (**5**, 79) and a horizontal type, endless block machine (**7**, 101), on which the cores for making hollow spaces in the block are automatically removed. Wavy edges on wallboard (**19**, 91) are eliminated, it is claimed by one invention, if the covering paper is first passed over an electric heating device by which the paper is left with uniform moisture contents.

Concrete

The concrete investigations made at various United States government agencies and the research laboratories of the National Crushed Stone Association and National Sand and Gravel Association are reviewed briefly in the January 4, 1930, issue. All of this work, complete or in abstract, was published in ROCK PRODUCTS during the last year.

Effects of Admixtures

Powdered admixtures in concrete were discussed by Duff A. Abrams in a paper delivered at the June meeting of the American Society for Testing Materials (**26**, 82). Most of the tests were made with high-early-strength cement to show the relationship between strength and workability, with and without admixtures. The admixtures tested were: Hydrated lime; limestone; colloidal clay (treated); colloidal clay; moler clay (calcined); volcanic ash; slag, precipitator earth. Taficial admixtures; diatomaceous earth. Tables and graphs in the report show results that indicate a lower strength concrete results when any of these were substituted for any part of the cement. There was an exception in the case of slag, precipitator dust and an artificial admixture, which slightly increased the strength of the cement at early ages. These were all puzzolanic materials, those which have a slight cementing value when mixed with water. The reason for the decrease in strength was found to be the increased water-cement ratio needed with admixtures.

E. S. Hastings, discussing diatomaceous earth (**6**, 50), shows microscopically why some diatomaceous earths made good admixtures and some do not. Blank tested five different cements (**6**, 81) with diatomaceous earth as an admixture, using the same aggregate and mixing to the same consistency in all tests In one the admixture acted as an injurious adulterant, steadily lowering the strength as increased percentages were added. With the other four cements a constant increase of strength was obtained, with small additions, and in the case of two cements the increase almost doubled the normal strength of the cement when large additions were made.

Based on extensive research and laboratory investigation (**20**, 90), Graf concludes that (1) calcium chloride increases the shrinking and expanding of cement mortar considerably; (2) trass retards the aggression of magnesia sulphate and magnesia chloride upon mortar; (3) with the same addition of cement, pulverized sands yield more permeable mortars than those having additions of moraine and river sand; (4) abrasion of the mortar increases with an increase in the proportion of fine sand; (5) the influence of the addition of water upon the extent of abrasion is greater in lean mortars than in rich mortars; (6) shrinkage and expanding of the mortars is less among the coarser mortars.

Gruen found that addition of water glass to concrete mixes resulted in lower strength and did not check the action of aggressive waters (**8**, 96).

Hardening of Concretes

The chemical composition of aggregates have a decided effect on the physical properties of concrete, according to a report of the Bureau of Mines. Kathrein made a detailed study also of the effects of different aggregates on concrete and the chemical reaction of the mortar (**24**, 109). Matras found that angular aggregates (**4**, 93) made a denser concrete with less shrinkage on hardening.

Keith found Kl-storage to give higher strengths (**10**, 105); prolonged storage in water after combined storage resulted in material strength reductions (**11**, 85). Pruessing, investigating hardening of cement and concretes, considers the process as a disintegrating process in which the large molecular compounds of the clinker are split up into compounds of simpler structure while water is being fixed. There are many intermediate members in the series of disintegrations which ultimately work towards a simple lime salt, alumina silicate and water-bearing silicic acid as the principal final products. The final products of the disintegrations are not attained in any cement under natural storage conditions. The chemical condition of the individual specimens is dependent on the age of the specimen and the nature of storage. Regarding formation of the lime salts, the reaction equilibrium between caustic lime and carbonate of lime leans towards the caustic lime during storage in water and toward carbonate of lime during storage in air, Pruessing states.

Matras, investigating shrinkage (**4**, 93), found it to be minimized when minimum amounts of mixing water are used and excess water sprayed on the specimen during the hardening stage. Addition of $CaCl_2$ increased the shrinkage and sodium silicate decreased shrinkage tendencies. Hess determined the strength of concretes made with early-high-strength cements (**20**, 88) under different conditions. He found steam curing to give lower strength, a fact which he attributes to the leaching out of lime from the concretes by the steam. More significant data on disintegration of alumina cement concrete was furnished by Coyne (**9**, 78), and according to Lund (**20**, 91), "sanding" of alumina cements can be expected after a loss of 11% of the combined water occurs; portland cement withstands water losses as high as 38% before "sanding."

Concrete Disintegration

Gruen, using the stereoscopic microscope to determine causes of concrete disintegration (**24**, 109), found that presence of gypsum or calcium aluminum sulphate was not always proof of a disintegrated concrete or even that disintegration was impending. Kuehl, working on the water requirements of different cements (**26**, 98), found that it varied widely, dependent on the degree of fineness the cement was ground. Portland cements of average fineness gave best strengths, and strength variations of 50% were noted between those ground too fine and too coarse. Budnikoff found strength to be affected by hydration of dead burned gypsum and recrystallization of gypsum in the cement (**20**, 90). He stated that no definite maximum limit for SO_3 contents was possible. Cracking of cement pats can be avoided, according to Haegermann, if they are immersed immediately after the initial set (**23**, 94).

Porous Concrete

The greater part of the patents for light-weight concretes call for use of a gas-forming agent and a foam to trap the gases. One process involves the use of cement, slag sand and aluminum powder (**3**, 110); another calls for the addition of metallic calcium or calcium alloys up to $1\frac{1}{2}$% of the dry mix (**20**, 90). The whole is given a short mix and water added,

after which it is poured into forms, leaving space for expansion. Extremely light concrete is said to result from the use of a calcined clay aggregate with cement, raw clay and powdered aluminum (**19,** 90). The mix is wetted and poured in greased forms to dry and then calcined at low temperatures. To a usual concrete mix a potassium soap foam is added (**1,** 78) and thoroughly mixed and the mass cast and allowed to harden. An American patent uses a foam agent or oil, the mass being subjected to violent air agitation (**2,** 87) before pouring. Two concretes derive their porous properties from the nature of the aggregates; the first uses whole sea shells (**8,** 97) to give cavities and the other is for a concrete lumber (**21,** 97) which can be sawed, nailed and otherwise handled as ordinary wood. This is made from Florida shell rock, 90% of which is crushed to ½- to 2-in. size, cement and lime.

Waterproof concrete (**22,** 98) results from the addition of 10% to 20% of mineral oil, 30% of fatty tars, fuel oil, etc., to the concrete mix, according to an American patent. Molded concrete products, featured by washable surfaces (**19,** 91) are obtained if the mold surface is previously treated wtih solutions of alkali salts of lysalbic or protalbic acids to delay the set of the local binding agents, according to an American inventor.

Miscellaneous

Activities of slag with consequent more rapid set and greater strengths is the basis of an interesting invention (**20,** 89). The process adds gypsum to the molten slag under reducing flame to convert the MnO of the slag to MnS. The lime content of the melt is then increased, the reducing action being maintained. Another process (**8,** 96) takes the slag as it comes from the blast furnace, passing it to the mouth of a conical ball mill, where it meets a quenching stream of water, whereby the slag is cooled and granulated, thus removing much of the work from the mill. By controlling the size of the mill balls and the water flow, the crushed slag may be discharged in a dry state.

By treating low-grade lead smelter tailings with lime and salt, potassium chloride (**21,** 100) and calcium chloride may be recovered, according to an investigation carried out at the Bureau of Mines. Another source of potassium chloride is the cement kiln dusts. A method of recovery treats these dusts with water, filters, cools the filtrate to the point where the solubility of potassium chloride is decreased and that of sodium sulphate is constant, thereby effecting a separation of the two salts (**4,** 93).

Vitreous products of basalt (**11,** 84) are made by a German patent. The basalt is first crushed, then melted in a gas-fired furnace, and finally poured in forms. These forms are cooled and put in a devitrefying furnace for annealing before storing outside. An excellent refractory can be made by heating serpentine or talc (**16,** 93) in the presence of an accelerator to form the magnesium orthosilicate, according to an American process. Decomposition of rock phosphate (**20,** 90) is effected by treatment with alkali oxide and limestone at a temperature in excess of 1000 deg. C. under influence of steam and by another process a mixture of rock phosphate, salt and silica is heated to volatilize the resulting phosphorus pentachloride, which is subsequently recovered. A patent was taken on a process for making asbestos-cement sheets (**12,** 95); successive layers of cement and asbestos were put down, filtered and pressed to the final product.

Two important investigations on agricultural limestone were reported. Kriege (**10,** 73), studying dissolution rates of limestone in acid media, found that the rate varied in inverse proportion to the particle size. Different limestones, he found, had specific rates which were not indicated by the physical properties. A Purdue Experiment Station report (**17,** 76) states that for liming purposes, 50-mesh agstone is no more effective than 10-mesh; a 4-mesh product can be used, but in greater amounts than the finer products, for the effectiveness is not at once apparent, but increases as time goes on. Hydrated magnesium limes were found to be just as good liming agents as the high calcium limes.

A number of patents were granted on dust collectors (**20,** 91; **17,** 79; **16,** 92; **10,** 105; **24,** 110); air separators (**19,** 90; **12,** 95; **18,** 89; **17,** 79; **15,** 86; **14,** 95; **3,** 110; **23,** 94; **24,** 110; **25,** 94; **11,** 85; **6,** 95; **19,** 91; **15,** 87; **9,** 79; **26,** 98), and other equipment pertaining to rock products preparation. A novel dredging arrangement, patented by Nicol (**16,** 95), is a combination of suction and dipper dredge. It has a plow-shaped point to loosen the material from the river bed, etc., and a jet elevator for suction. In view of the interest in slurry filters, the process proposed by an American inventor (**11,** 85), that of thickening by sedimentation and filtration, the settled solids being scraped off as fast as deposited, is of interest. Allen developed a novel automatic mixing and blending bin (**21,** 97) for aggregates.

Aggregates

Research on aggregates is reviewed in detail ROCK PRODUCTS, January 4, 1930, by Shaw, Goldbeck, Walker, Hubbard and others. Foreign investigations on this subject were very few and widely scattered. Endell, checking on the suitability of various aggregates for concretes to be exposed to heat (**24,** 110), as chimneys, etc., found that concretes made with siliceous aggregates should not be used at temperatures of 1300 deg. F. and above. The sudden expansion of these aggregates at this temperature would cause serious cracking and disintegration. Metallic slags had a smaller and more uniform expansion, hence were best suited. Carson patented a process of preparing dry limestone (**19,** 91) aggregate; the wet limestone and a small amount of lime are ground together, the lime evidently taking up the excess water in hydrating.

Modern English Cement Mill at Stamford

KETTON Portland Cement Co., Ltd.'s recently completed cement mill at Stamford, England, though of small capacity (325,000 bbl. per year), has a number of interesting features. Raw materials are close at hand, the clayey quarry stripping being utilized as well as the waste from dimension stone quarrying, which has been carried on at the Ketton quarry for almost 800 years! During this time, dump piles estimated to contain 3,000,000 tons of limestone have accumulated, so that it will be a number of years before actual quarry operations for stone for the cement kilns will be necessary.

Limestone is loaded to 12-cu. yd. cars and hauled to a "tippler hoist," a peculiar arrangement whereby the entire quarry car is lifted 28 ft. and dumped to the crusher. The wet process of manufacture is used; clay and limestone, after grinding to desired fineness, are mixed, blended, corrected and finally passed to a single rotary kiln, coal-fired, 270 ft. long by 8 ft. 4 in. by 10 ft. 4 in. dia. (enlarged burning zone). This kiln is equipped with a "Unax" cooler.

The entire plant requires 1300 kw. to operate and this is supplied from two steam boilers, automatically stoked, which furnish steam to an 1850-kw. turbo-generator. Provision has been left for large expansion of both the cement mill and power plant.

Both standard portland cement and high early strength portland cement are made.—*Cement, Lime and Gravel* (England).

Safe and Proper Use of Explosives

"COMMERCIAL Explosives: Their Safe and Proper Use" is the name of a new booklet just issued by the Hercules Powder Co., Wilmington, Del. This booklet is intended to aid users of explosives in improving blasting practices and avoiding accidents. It defines explosives, lists the various types and their characteristics and offers directions for loading, priming and firing. Modern types and processes are enumerated.

Handling and storage of explosives is also covered and general safety rules cited, many of which are recommendations of the National Safety Council, the United States Bureau of Mines and the Institute of Makers of Explosives. In addition the booklet offers information on detonators, blasting machines and other blasting accessories.

A Method of Studying the Reactions in a Portland Cement Kiln*

By William N. Lacey and Hubert Woods

California Institute of Technology, Pasadena, and Riverside Cement Co., Los Angeles, Calif.

THE material entering the rotary kiln for burning portland cement consists of a finely ground mechanical mixture of limestone and clay, or of chemically similar materials. As the charge travels forward through the kiln it is gradually raised in temperature, absorbing heat from the hot gases traveling in a countercurrent. During this process the following changes occur in the order named: (1) evaporation of free moisture; (2) removal of combined water from hydrous clay; (3) removal of carbon dioxide from magnesium carbonate; (4) removal of carbon dioxide from calcium carbonate; (5) reaction of calcium oxide with clay to form $4CaO{\cdot}Al_2O_3{\cdot}Fe_2O_3$, $3CaO{\cdot}Al_2O_3$ and $2CaO{\cdot}SiO_2$; (6) reaction of remaining CaO with $2CaO{\cdot}SiO_2$ to form $3CaO{\cdot}SiO_2$. These steps undoubtedly overlap, and two or more may be proceeding simultaneously at a given point in the kiln.

The last three reactions are probably of greatest interest to the chemist who is concerned with conditions of operation of the burning process. The compounds $3CaO{\cdot}SiO_2$ and $2CaO{\cdot}SiO_2$ are the most desirable ones in the cement from the viewpoint of strength development. The formation of $3CaO{\cdot}SiO_2$ is the most difficult to carry to completion. In a mix carrying a higher percentage of CaO it is necessary to heat the charge to a higher temperature and perhaps hold it there for a longer time in order to insure completeness of reaction. If this is not accomplished, some uncombined calcium oxide will be left in the product. This is undesirable, not only because it results in a smaller percentage of $3CaO{\cdot}SiO_2$, but also because the free lime, when present in any large extent, causes unsoundness in the cement.

Since the chemist is interested in these processes of production and recombination of calcium oxide in the kiln charge, the percentage of free lime present at various stages of the process affords a means of following the course of these reactions. A method of determining uncombined calcium oxide has been described by Lerch and Bogue (1, 2), which has proved very satisfactory for this purpose. The method depends upon a titration of the lime with ammonium acetate in absolute alcohol solutions, calcium acetate and ammonia being formed and the latter removed by heating, allowing the use of phenolphthalein as an indicator. Determination of "loss on ignition" furnishes data concerning the progress of steps (1) to (4).

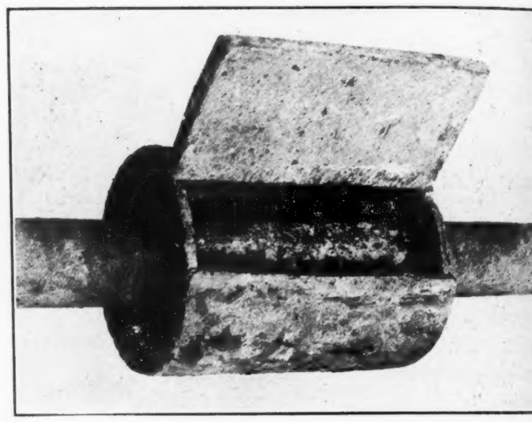


Fig. 2. Cylindrical sample cup with extended lip

Method of Sampling

In order to study the condition of the charge at different stages of the process, it is necessary to obtain samples from a number of points along the length of the kiln. As far as the authors have been able to ascertain, the only method that has been used to obtain such samples depends upon stopping a kiln and allowing it to cool sufficiently so that a person may go in and sample the material found at different locations. This method has numerous disadvantages. In the lower end of the kiln a coating of charge builds up on the inner surface of the refractory bricks. This material will have been at the temperature of the charge for a long period and so will not be representative of the material in the moving stream. During the cooling of the kiln a large portion of this coating will spall off and be mixed in with the actual charge. When a rotary kiln has been shut down, it must be rotated at intervals during the cooling period to prevent warping of the kiln and uneven cooling of the refractories. This moves the material from the position it occupied at the time when normal operation ceased. To shut down a kiln for the purpose of sampling in this manner is hardly feasible.

To be really useful, kiln charge samples should be taken at intervals over a period of hours in order to give representative results and eliminate the effects of the irregularities of movement of the material. In addition, the kiln should be in operation under the desired conditions at the time of sampling. A system of obtaining such samples has been developed at the Riverside Cement Co. The arrangement and dimensions of the kiln sampled are shown in Fig. 1. The locations from which samples are taken are indicated by the numbers from 1 to 12 along the axis of the kiln. All distances are measured from the front end of the kiln.

Samples 1 to 5 are taken from the front of the kiln by means of a sample cup in the end of a long iron pipe. At first the sampler was water-cooled, but this was found to be unnecessary. The sample cup is cylindrical and provided with an extended lip as shown in Fig. 2. The sampler can be inserted to the proper distance with the lip in such position as to keep material from entering the cup. By rotation of the pipe, the lip causes the charge to feed into the cup. By turning back again the sample is protected during withdrawal. Suitable marks on the pipe facilitate sampling at the proper distance from the kiln front.

To obtain charge samples from points 6 to 12 (Fig. 1) tubes are inserted in the walls of the kiln. These tubes (Fig. 3) are made of heat-resisting metal and are installed when the kiln is being relined. One nut inside the steel shell and another outside hold the tubes firmly in place and the refractory bricks are then set around them. The inner end of the tube is flush with the inside refractory face. The clamp shown in Fig. 3 is fastened on the outside end of the tube and serves as a bayonet catch. When sam-

*Reprinted by permission from *Industrial and Engineering Chemistry* (1929), 21, 11.

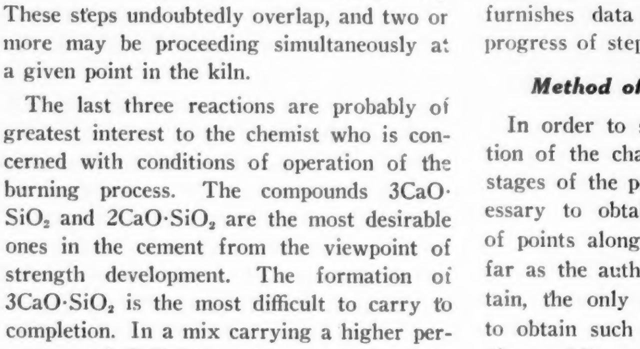


Fig. 1. Arrangements and dimensions of the kiln sampled

ples are not being taken, a plug or stopper is caught in place by the bayonet clamp.

Sampling Procedure

To obtain a sample, the plug is removed when the tube has reached a position about level with the kiln axis and is moving downward. An iron rod is thrust through the tube to clear it and then the sample receiver is locked in place. This receiver consists of a piece of steel tubing as large as will slide through the sample tube and approximately the same length as the latter. On the outer end is welded a piece of steel plate, which extends to one side far enough to serve as a handle. The receiver is left in position during nearly half a revolution and as it approaches the lowest position it fills up with charge. As the sample tube moves upward toward a horizontal position it is withdrawn and replaced by the plug. The sample is then placed in a tin can, with tight-fitting cover, suitably marked for identification.

These sample tubes have caused no trouble with kiln linings and have been in service for many months without need of replacement. A complete set of samples can be taken by two men in less than ten minutes.

Results

The results of analysis of a typical set of samples are shown in Fig. 4. The samples are composited from five consecutive hourly samples. They indicate that comparatively little calcination of limestone occurs in the upper 45 ft. of this kiln's length, as shown by small decrease in ignition loss and small increase in free lime. During the passage of the next 25 ft. calcination occurs rapidly. After this stage recombination of the lime has become rapid, lowering the free lime, although calcination continues to take place, as indicated by the ignition loss curve. It would appear that, under the prevailing conditions, the calcination reaction might well be the one which limits the approach to equilibrium, since ignition loss persists in appreciable amount to within 5 ft. of the kiln front, whereas the lime free to recombine becomes very low several feet farther back.

The effects of a change in firing conditions are illustrated by Fig. 5. Results obtained in the preheating zone are little different from those in Fig. 4. Subsequent calcination is slower and recombination of the lime is not completed, producing an unsatisfactory clinker. Under these conditions, the recombination of the lime appears to be the slow process, lagging behind the calcination of the calcium carbonate.

Since rotary kilns vary in design or dimensions, and operating conditions may differ, the results given above serve only to illustrate the use of the method. The curves given may only be considered representative of the specific conditions prevailing. The method would seem, however, to be capable of yielding interesting and valuable results regarding the influence of the various factors involved in kiln operation.

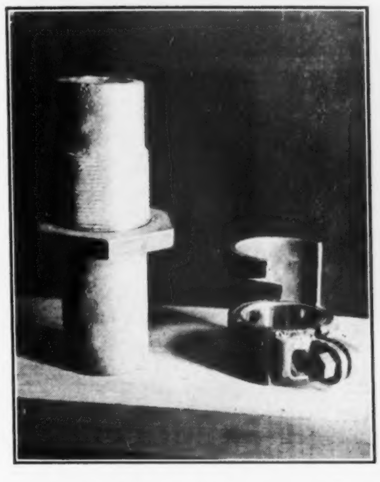


Fig. 3. Sample tubes installed in the walls of the kiln

Acknowledgment

John Treanor, president of the Riverside Cement Co., and Earl MacDonald, general superintendent, have given their hearty support and cooperation in this investigation.

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Heat Balance in Rotary Kilns

IN a recent article in *Cement and Cement Manufacture* (England), A. C. Davis summarizes the various operations in which heat is usefully expended, recovered or wasted in rotary kiln operation. He gives a typical operation, citing the data required and the methods of deriving these, after which he offers the following as a heat balance:

HEAT BALANCE IN A ROTARY KILN

	B.t.u.	Percentage of standard coal
Debits:		
Heat expended in chimney gases from—		
CO_2 *ex* raw materials	8,366	0.664
H_2O raw materials	144,692	11.480
Combustion gases	57,861	4.592
Excess air	3,580	0.284
H_2O in coal moisture	4,296	0.341
CO from incomplete combustion	2,907	0.231
From dust and air moisture	2,560	0.203
Heat required in dissociation of carbonate	91,120	7.232
Heat lost in clinker from cooler	4,700	0.373
Total heat accounted for	320,082	25.400
Balance—not accounted for	45,928	3.648
Total	366,010	29.048
Credits:		
Coal calorific value	340,200	27.0
Exothermic reaction	17,880	1.419
Organic matter in slurry	7,930	0.629
Total	366,010	29.048

Geophysical Prospecting

THE U. S. Bureau of Mines has issued Technical Paper No. 439 giving the results of geophysical investigations at Caribou, Colo. The study was made with the idea of determining which geophysical method or methods would be most economical and successful in any particular district. The report was made by C. A. Heiland, Charles W. Henderson and J. A. Malkovsky.

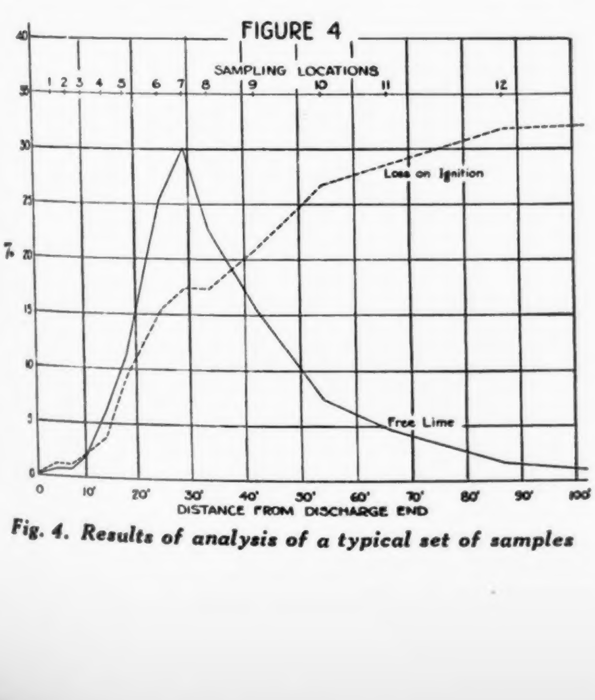


Fig. 4. Results of analysis of a typical set of samples

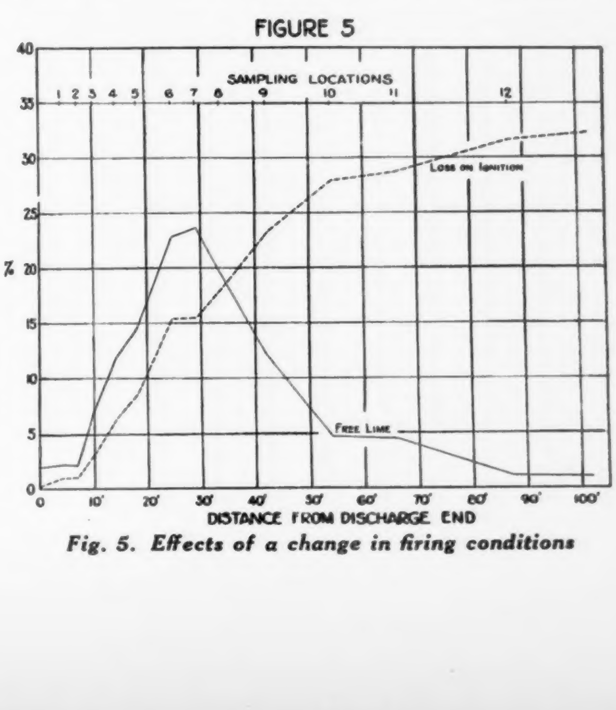


Fig. 5. Effects of a change in firing conditions

Japanese Research on Cements

Some Recent Contributions to the Chemical Technology of Portland and Other Cements

THE following abstracts are taken from articles appearing in the *Journal of the Society of Chemical Industry*, Japan, and are representative of the recent advancements made by the Japanese in cement technology. The development has been rapid, due to a great degree to the efforts and research of Prof. Shoichiro Nagai of the Department of Applied Chemistry, Tokyo Imperial Institute.

Microscopic Hydration of Rapid Hardening Cements. The authors studied, microscopically, the process of hydration of commercial aluminous cements and super cements of portland type using Keiserman and Blumenthals' staining process. In case of aluminous cements, setting and hardening occur as the result of formation of crystals consisting of lime and alumina, with the retarded formation of amorphous, gelatinous mass consisting also of lime and alumina. The presence of lime hydroxide was not observed in hydrated products.

Super cements of portland type were found, upon hydration, to behave as in case of ordinary portland cements; the setting occurs as the result of formation of crystals and the hardening as the result of retarded impregnation and coagulation of amorphous mass among fine network of crystals.

The authors paid special attention to the solubility of cements and crystallization of hydrated crystals out of once dissolved constituents in regard to the phenomena of setting and hardening.—*Kokushi Kumagae and Tosaku Yoshioka.*

Studies on Modulus of Rupture of Cement Mortar. The author obtains data on other physical strengths and compares them to the compressive and tensile strengths. The modulus of rupture is examined and some results are reported here as the first paper. They are briefly summarized as follows:

1. Five following samples were tested: three portland cements, one blast furnace slag cement and one "Soliditit," made, in 1926, in Japan. To prepare testing briquettes of 1:3 cement mortar, the new standard sand (natural Soma silica sand in Fukushima Prefecture) for the "Japanese Standard Rules for the Testing of Portland Cement" revised in 1927, and the old standard sand (crushed sand of silica rock) for the old rules, are both used. Three physical strengths—tensile strength, compressive strength and modulus of rupture—are tested to obtain the coefficient of modulus of rupture to tensile strength.

2. This coefficient for three portland cements and one blast furnace slag cement are almost constant and nearly 2.05 for every age of test pieces, in the case of using the new standard sand. But a little larger value of nearly 2.20 for Soliditit is obtained.

3. By using the old sand the coefficient for portland cement mortar increases from 2.05 to 2.25.

4. The same coefficient for several natural rocks are obtained by the test pieces prepared from four natural rocks: (a) granite in Hidachi, 2.38; (b) Oya-ishi in Shimozuke, 2.26; (c) sandstone in Kii, 2.23, and (d) Kokwaseki in Izu, 2.27. These results are nearly equal to the above obtained 2.25 for portland cement and the old standard sand mortar.—*Shoichiro Nagai.*

Tests on the Fused Portland Cement and Aluminous Cement. The author prepared fused portland cement and aluminous cement in an arc type electric furnace (electric capacity = 35 k.w.) and tested the qualities of these cements. Results are shown in the table below.

A very finely pulverized portland cement has also been tested and compared.

TESTING RESULTS ON FUSED PORTLAND CEMENT AND ALUMINOUS CEMENT

	Fused portland cement		Aluminous cement		Very finely powdered portland cement	
Fineness						
Residue on 900 mesh sieve, %	0.28		......		......	
2500 mesh sieve, %	0.84		1.48		0.68	
4900 mesh sieve, %	4.82		3.68		2.18	
Specific gravity	3.08		3.09		3.17	
Setting time						
Initial	1 hr. 9 min.		3 hr. 7 min.		2 hr. 14 min.	
Final	2 hr. 1 min.		4 hr. 8 min.		3 hr. 59 min.	
Atmospheric temperature, deg. C.	25		23		21	
Water temperature, deg. C.	22		21.5		20	
Quantity of water added, %	26		26.7		25.3	
Soundness						
Normal test	Sound		Sound		Sound	
Boiling test	Sound		Sound		Sound	
Tensile strength, kg./cm.²	Neat	1:3 Mortar	Neat	1:3 Mortar	Neat	1:3 Mortar
In moist air 24 hours	......	......	38.8	18.0	45.8	23.3
Thereafter in water 1 day	64.5	26.8	51.3	22.4	67.1	32.8
Thereafter in water 2 days	82.5	26.5	51.5	23.0	68.0	36.3
Thereafter in water 3 days	77.0	25.3	49.8	20.0	73.1	37.3
Thereafter in water 4 days	77.3	29.5	50.8	20.5	74.0	34.2
Thereafter in water 5 days	74.8	30.0	46.3	19.8	73.8	37.0
Thereafter in water 6 days	76.5	29.0	47.0	22.9	71.2	33.8
Thereafter in water 27 days	74.8	30.0	61.5	24.4	71.9	41.0
Chemical composition						
Ignition loss	....		....		0.76	
SiO_2	22.60		10.52		22.60	
Al_2O_3	6.38		41.71		5.98	
Fe_2O_3	4.82		8.77		3.74	
CaO	63.34		38.74		63.66	
MgO	0.81		0.36		0.97	
SO_3	1.88		0.88		1.82	
C	3.96		5.92		......	
CaC_2	0.23		1.35		......	
	All Fe (Fe+FeO) was determined as Fe_2O_3 Add gypsum when grinding		All Fe (Fe+FeO) was determined as Fe_2O_3 Add no gypsum when grinding		Add gypsum when grinding	

—*Itsuo Yamazawa.*

Acid-proof Cement Mortars. Acid-proof cement mortars are generally composed of two components, the one being siliceous powder and the other alkali silicate solution of definite concentration. These are made up by mixing and kneading the two materials. There are two types of the siliceous powder, the first is of silica (95-97%) and the second is composed of silica (about 70%), alumina (10-15%) and iron oxide (about 5-10%). The alkali solution is obtained by dissolving sodium silicate and for this purpose the silicate of high silica content ($Na_2O{\cdot}3SiO_2$ or $Na_2O{\cdot}SiO_2$) is far better than that of low-silica content ($Na_2O{\cdot}2SiO_2$, $Na_2O{\cdot}SiO_2$, etc.)

In the present paper, the authors report the results of the preliminary studies on physical properties and chemical compositions of six samples of siliceous powder and two sorts of alkali silicate solution.

The authors report the results of many comparative studies on physical tests, as compressive strength, binding strength, etc., and chemical tests, as solubility or resistance to concentrated inorganic acids, as sulphuric, hydrochloric, nitric acid, etc. These test pieces of acid-proof cement mortars are prepared by mixing, kneading and moulding siliceous powders and alkali silicate solutions, whose proportions, chemical compositions and physical properties were already reported in the first paper.

By these comparative studies, some important points were observed relating to the properties and compositions of two

components of mortars. The first—soluble sulphates, chlorides, etc., in the siliceous powders—there should be only traces, since they form, on kneading them with alkali silicate solution, alkali salts soluble in water or acid solution and disintegrate the mortars.

The second important point is the fineness of the siliceous powder. The fineness distribution or fineness modulus of the powders are to be in the proper state. Some parts of coarse sandy particles are necessary to the acid-proof cement mortars, which react as sand as in the ordinary portland cement mortars.

The third point of importance is the content of silica in silicates of the alkali silicate solutions. The sodium silicate of high content of silica, as $Na_2O{\cdot}3SiO_2$ or $Na_2O{\cdot}4SiO_2$, is better than those of low content of silica, as $Na_2O{\cdot}2SiO_2$ or $Na_2O{\cdot}SiO_2$. The alkali silicate solution of the former silicates content hardens the mortars very quickly and is much resistant to mineral acids. On the contrary, the silicate solution of the latter silicates of low silica content makes the mortars slow hardening, and the alkali combines with acids to soluble sulphate, chloride, nitrate, etc., which dissolve in water or acid solution and disintegrate the mortars.—*S. Nagai and S. Matsuyama.*

Strength Formula of Cement-Mortars. The author, Shoichiro Nagai, studied first Unwin's rational formula $y=a+b(x-1)^n$ (W. C. Unwin: *The Testing of Materials of Construction*, 1899, 430; 1910, 458), in which a is the strength at one week, y is the strength at x weeks, b is a constant of cement, and n is 1, 1/2, 1/3, etc. By applying many results of strength tests of 1:3-mortars of Japanese and foreign cements at every curing age (1, 2, 3, 4, 8, 13 and 26 weeks), the value $b=\dfrac{y-a}{(x-1)^n}$ was observed to be never constant as in the following tables:

TABLE I. VALUES OF $b=\left[\dfrac{y-a}{(x-1)^n}\right]$ IN TENSILE STRENGTH

	n : 1/3						n : 1/2					
No. of cement	2w	3w	4w	8w	13w	26w	2w	3w	4w	8w	13w	26w
Low silica type....(1)	0.30	0.47	0.55	2.25	2.98	2.84	0.30	0.42	0.46	1.63	1.96	1.94
(2)	1.00	2.38	3.74	3.45	3.19	2.94	1.00	2.12	2.54	2.49	2.10	1.72
High silica type..(5)	2.10	2.78	3.19	3.66	3.50	3.11	2.10	2.48	2.60	2.59	2.31	2.12
(6)	2.70	3.97	4.58	4.18	4.28	4.34	2.70	3.54	3.72	3.02	2.83	2.62

TABLE II. VALUES OF $b=\left[\dfrac{y-a}{(x-1)^n}\right]$ IN COMPRESSIVE STRENGTH

	n : 1/3						n : 1/2					
No. of cement	2w	3w	4w	8w	13w	26w	2w	3w	4w	8w	13w	26w
Low silica type....(1)	47.0	61.7	66.6	83.7	90.9	78.7	47.0	54.5	55.4	60.5	60.0	46.0
(2)	67.0	88.9	100.6	99.4	91.3	74.9	67.0	79.2	82.6	71.8	60.3	43.6
High silica type..(5)	47.0	62.7	66.6	94.1	100.9	89.6	47.0	70.0	72.7	68.0	66.7	52.4
(6)	67.0	93.7	106.1	107.2	104.9	113.2	67.0	83.4	88.3	77.5	69.3	60.8

Thus, the author observed that the above Unwin's rational formula can never be applicable to the early-high-strength portland cements, and then the relation of strengths and many curing ages (2, 3, 5, 7, 14, 21, 28, 56, 91 and 182 days) was studied by graphical and calculation methods. The reasonable strength formula was obtained.

Continuing the studies on the increasing rate of strength of 1:3-cement mortars to curing ages, the author modified the parabolic equation between strength and logarithm of curing age in days.

$$S=A+B{\cdot}\log d \quad \text{.........................} (1)$$

In this strength formula, S is the strength at d days, and A and B are constants of each cement. Applying many results of strength tests on many curing ages and calculating by the method of least squares, constants A and B were obtained for tensile and compressive strengths of each cement.

These results were compared as in the following table. Close observations were made on the linear property between the value of B(2) and activity index(3) or silica modulus(4) in the chemical compositions of cements

$$B=(S-A){\cdot}\log d \quad \text{...........................} (2)$$

$$\text{Activity index} = SiO_2{\cdot}Al_2O_3 \quad \text{.............} (3)$$

$$\text{Silica modulus} = SiO_2{\cdot}(Al_2O_3+Fe_2O_3) \quad \text{....} (4)$$

ACTIVITY INDEX, SILICA MODULUS AND CONSTANT B

	Activity index	Silica modulus	$B=(S-A).\log d$ Tens. str.	$B=(S-A).\log d$ Comp. str.
Low silica type Japanese portland cements				
(1)	3.73	2.15	5.70	192
(2)	3.83	2.10	6.07	176
(3)	3.20	2.05	4.09	167
(4)	4.06	2.15	6.64	196
Mean	3.70	2.11	5.62	183
High silica type Japanese portland cements				
(5)	5.19	2.95	7.71	206
(6)	4.93	2.93	8.04	234
(7)	5.13	2.73	9.25	279
(8)	4.88	2.92	8.75	258
Mean	5.03	2.89	8.44	244
Foreign portland cements				
(10)	3.88	2.62	6.04	162
(11)	3.74	2.71	5.27	138

The author studied the strengths of mortars of two types (low silica and high silica) of cements on long combined hardening tests, and compared them with those on long water hardening or air curing. The results are briefly summarized as follows:

(1) On long combined hardening (1 day in moist air, 6 days in water and then in air curing to 26 weeks), the strength of low-silica type cements stopped after 4 or 8 weeks' hardening, as those on long water hardening. So the difference of strengths at the same ages of these two hardening tests is nearly constant at any curing ages after 8 weeks. But in the case of the high-silica type cements, the difference of strengths between these long combined and water hardening tests decreased gradually, owing to the increase of strength on water hardening.

(2) On long period air hardening the strengths are very low, compared with those on water hardening or combined curing. The strength of low silica cements on long air hardening stopped after 4 or 8 weeks, but in the case of high silica cements, the strength increases slowly on long ages.

Studies were made on the combined hardening of blast furnace slag cements and "soliditit" cements. These mixed portland cements are recent products in Japan. The blast furnace slag cements are manufactured in the Yawata Seitetsusho (the Yawata Imperial Government Steelworks) at Yawata in Kyushu and in the Department of Steelworks of the Asano Shipbuilding Co. at Tsurumi near Tokyo, the production being nearly 350,000-400,000 bbl. per year in the former and 150,000-180,000 bbl. per year in the latter. The "soliditit" cement is manufactured by the Nippon Soliditit Co., Ltd., in Tokyo, making 100,000-120,000 bbl. per year.

The increase of strength on combined hardening to common curing is smaller in the blast furnace slag cements than in the "soliditit" cements. This fact was again ascertained by long combined hardening tests (1 day in wet air, 6 days in water and then in air curing to 8, 13 or 26 weeks.

The effects of admixture to the strength of mortars on combined hardening were studied. Acid admixtures, as pozzolans, silica earth, kieselguhr, etc., increased the strength of mortars of cements of low-silica type both on water and combined hardening, but they were little effective to cements of high-silica type.

Electrical Investigation of the Setting and Hardening of Rapid-Hardening Cements. The author uses the electrical resistance method to study the setting and hardening processes of the rapid-hardening cements such as aluminous cements and "super" portland. A summary of the results follows.

(1) In the conductivity-time curve of aluminous cements, two breaks—the first corresponding to the hydration of the calcium aluminate and the second to that of the calcium alumino-silicate or calcium silicate—were observed, but in the case of the super cements of the portland type, only one break which corresponds to the hydration of the calcium alumino-silicate or calcium silicate, was observed. From these experimental results, the writer has come to the conclusion that calcium aluminate does not probably exist in the portland cement clinker.

(2) The specific electrical resistance during the setting and hardening of the aluminous cement is much greater than that in the case of the super cement of the portland type, the rate of its increase with time in the case of the former being very much greater.

(3) The setting time of the cements mentioned above was determined from their conductivity-time curve. The effect of temperature on the setting time has also been studied.—*Yosomatsu Shimizu.*

Quality of Portland Cement of Japan. The progress of portland cement industry of this country is reviewed by S. Kano, manager of the Onoda Cement Co., in the *Journal of the Society of Chemical Industry*, Japan. He has made a full survey of the improvements made in the processes of the production and in the qualities of the products in the last 40 years.

The data given below are of the products of a factory belonging to the Onoda company and may be of interest, as it gives the quality of the earlier products. The figures from 1897 to 1912 are the average of 50 to 100 tests in a year; those from 1917 are the average of no less than 300 tests in a year.

The tables give the average of results of tests made on cements actually found on the market at the time indicated. As the products of nearly all of the factories of this country were included in the test, the average given can rightly be taken as the fair representative of the quality at the time.

TEST DATA ON JAPANESE CEMENTS

	Fineness: Residue on 4900 mesh sieve	Tensile strength, kg./cm.^{2} Neat 7 da.	Neat 28 da.	Neat 3 da.	1:3 mortar 7 da.	1:3 mortar 28 da.	Compressive strength, 1:3 mortar, kg./cm.^{2} 7 da.	28 da.	Hydraulic modulus
1887	......	20.5	26.6	......	8.5	11.2	......	......	1.73
1892	43.4%	28.4	36.4	......	8.8	11.6	......	......	18.6
1897	24.8	31.5	37.5	......	7.8	11.2	......	......	1.88
1902	18.6	46.4	49.8	......	13.6	16.3	60	93	1.93
1907	19.4	46.3	49.8	......	19.1	22.2	130	169	1.99
1912	18.5	42.6	46.8	......	19.6	25.0	121	177	1.95
1917	8.1	59.2	65.7	......	22.4	28.3	168	243	1.98
1922	6.0	73.8	79.9	......	23.8	30.8	174	255	2.01
1926	3.0	78.2	85.7	......	30.8	36.5	279	378	2.09
1927, January-July	2.0	79.5	82.4	28.4	31.8	36.9	329	438	2.13

PHYSICAL STRENGTHS AND CHEMICAL COMPOSITION OF VARIOUS JAPANESE CEMENTS

Year	1909-10	1913	1914	1915	1917	1919	1920	1922	1925	1926	*1927
Number of factories	23	20	18	11	20	22	21	28	28	26	20
Fineness: Residue on 4900 mesh sieve, %	15.8	14.3	11.9	11.6	11.8	12.0	8.7	......	7.8[3]	5.1[7]	3.2
Tensile strength, kg./cm.^{2}											
Neat 1 wk.	44.9	51.4	51.1	55.3	55.4	53.8	60.2	67.7	75.6	75.5	79.3
Neat 4 wk.	46.5	54.5	53.5	62.9	61.1	61.0	68.3	72.0	82.3	81.4	87.4
1:3 mortar 1 wk.	19.0	23.0	22.0	24.0	21.5	20.9	22.7	23.7	27.6	30.6	31.9
1:3 mortar 4 wk.	24.3	30.0	28.8	30.6	28.8	28.2	30.5	30.9	35.0	37.2	38.1
Comp. strength, kg./cm.^{2}											
1:3 mortar 1 wk.	90.8	127.5	135.2	163.8	146.7	138.6	121.8	148.3	187.0	226.4	283.6
1:3 mortar 4 wk.	128.2	174.8	192.8	236.0	220.9	210.0	188.4	216.1	269.8	298.3	316.9
Chemical Composition											
Ignition loss	3.13	2.88	......	3.31	3.15	2.35	2.23	3.22	2.00	2.23	1.40
Insoluble residue	0.37	......	......	0.47	0.71	0.49	0.61	0.48	0.40	0.33	0.22
SiO_2	21.81	22.54	......	21.97	21.72	22.94	22.45	22.26	22.39	22.38	22.58
Al_2O_3	6.96	7.30	......	6.74	6.76	6.35	6.47	6.40	6.07	5.54	4.98
Fe_2O_3	3.01	3.09	......	2.94	3.10	2.98	3.02	3.19	3.41	3.27	3.12
CaO	60.93	60.81	......	61.51	61.29	61.42	60.97	61.14	62.53	63.35	64.82
MgO	1.20	1.16	......	1.16	1.14	1.23	1.30	1.39	1.30	1.22	1.30
SO_3	1.40	1.58	......	1.17	1.47	1.33	1.41	1.47	1.41	1.26	1.25
Total	98.81	99.36	......	99.27	99.34	99.09	99.46	99.55	99.51	99.58	99.67
Hydraulic modulus	1.92	1.85	......	1.95	1.94	1.90	1.93	1.92	1.96	2.03	2.11

*January to July.

It can be seen from the above that there was no improvement in the quality, the strengths even decreasing in the years between 1917 and 1920. This was due to the excessive demand during the war time and the period soon after it.

Relations Between Composition and Strength of Cement Mortar on Combined Hardening. I. The author, Shoichiro Nagai, observed, in his studies on cements, that the differences of compressive and tensile strengths of cement mortars between combined air and water hardening (1 day in wet air, 6 days in water and 21 days in air curing) and those on common water hardening (1 day in wet air and 27 days in water curing) owe much to the chemical compositions of cements.

TABLE A. CHEMICAL COMPOSITIONS OF EIGHT PORTLAND CEMENTS

Portland cement	Ignition loss	Insoluble residue	SiO_2	Al_2O_3	Fe_3O_3	CaO	MgO	SO_3	Free CaO
Low SiO_2 type									
No. 31	1.30%	1.12%	20.15%	5.41%	3.92%	63.32%	3.61%	1.63%	1.76%
No. 32	0.68	0.28	20.58	5.37	4.45	65.75	0.96	1.26	1.78
No. 33	0.75	0.66	20.17	6.20	3.63	66.02	1.14	1.36	2.72
No. 44	1.26	0.32	20.44	5.03	4.63	65.39	0.99	1.26	2.43
High SiO_2 type									
No. 34	0.87	0.37	22.79	4.39	3.33	65.64	1.47	1.45	1.08
No. 36	1.08	0.33	23.16	4.70	3.21	65.48	1.10	1.07	1.59
No. 37	1.52	0.15	22.84	4.42	3.81	65.20	0.82	1.24	1.24
No. 39	0.38	0.28	23.31	4.78	3.19	65.92	1.41	0.97	0.95

Two types, low and high silica types, of eight portland cements were tested for their tensile and compressive strengths of 1:3 standard sand mortars and chemical compositions. The latter are given in the table above (Table A).

The increase of strength of cement mortar on combined hardening to those on common hardening were compared with the activity index (ratio of $SiO_2:Al_2O_3$), the silica or silicate modulus [ratio of $SiO_2:(Al_2O_3+Fe_2O_3)$], or the iron or flux modulus (ratio of $Fe_2O_3:Al_2O_3$), and the clear and close relation was observed between these moduli and strengths.

Continuing the study on combined hardening of cement mortars in the first report, the author calculated two following ratios between the chemical composition of cements and studied the relations between these ratios and strength of mortars on combined hardening (1 day in moist air, 6 days in water and 21 days in air curing) and on common hardening (1 day in moist air and 27 days in water curing). The results are briefly summarized as follows:

(1) Lime-silica combining ratio is calculated as follows:

$$\frac{CaO-(1.65\times Al_2O_3+0.70\times Fe_2O_3+0.70\times SO_3+\text{Free } CaO)}{SiO_2-0.80\times(\text{Insol. res.})}$$

In this ratio free lime was determined by the method proposed by Lerch and Bogue (*Ind. Eng. Chem.*, 1926, **18,** 739) and the factor (0.80) of insoluble residue of portland cement is of silica content, which was obtained by analysis of insoluble residue of some portland cements. This ratio is in linear proportion with the increase of strength of cement mortar on combined hardening to that on common hardening.

(2) Calcium silicates ratio and silicate lime ratio are calculated as follows:

$a=CaO-(1.65\times Al_2O_3+0.70\times Fe_2O_3+0.70\times SO_3+\text{free } CaO)$

$b(\%\text{ of } CaO \text{ forming } 2CaO\cdot SiO_2)=2\times[2.80\times(SiO_2-0.80\times[\text{Insol. res.}])-a]$

$c(\%\text{ of } CaO \text{ forming } 3CaO\cdot SiO_2)=a-b$

$d(\%\text{ of } 2CaO\cdot SiO_2)=1.54\times b$

$e(\%\text{ of } 3CaO\cdot SiO_2)=1.36\times c$

$$\text{Calcium silicates ratio}=e/d=\frac{3CaO\cdot SiO_2}{2CaO\cdot SiO_2}$$

$$\text{Silicate lime ratio}=c/b=\frac{3CaO(SiO_2)}{2CaO(SiO_2)}$$

These ratios are also in close relation with the increase of strength on combined hardening to that on common hardening.

Further, the author is studying the longer combined hardening and the effects of siliceous matters mixed to cements on combined hardening.

Recent Advances in Japanese Portland Cement Industry. In the last five years, 1924-28, the portland cement industry of Japan has made a remarkable progress as shown in the following Table I. The total capacity of mills is now estimated at about 26,000,000 bbl. per year and it will reach 28,500,000 bbl. in 1929.

TABLE I. RECENT STATUS OF JAPANESE PORTLAND CEMENT INDUSTRY

Year	Production in barrels	Increase	Number of Companies	Number of Factories	Number of Workmen	Capitals in yen	Mean annual factory production, bbl.
1924	12,764,000	....	24	32	12,940	121,315	399,000
1925	14,559,000	14%	22	34	10,926	121,450	428,000
1926	18,610,000	28	21	35	16,213	129,910	532,000
1927	21,053.000	13	21	34	12,525	187,410	619,000
1928	*22,400,000	14	19	33	....	191,377	679,000

*Estimation.

TABLE II. CHANGE OF SIZE OF ROTARY KILNS AND MILLS

	Number of rotary kilns (length in meters) 0-20	20-30	30-40	40-50	50-60	60-	Total	Maximum size of tube type mills (Dia. x length) Meters
192[illegible]	6	5	24	6	5	11	57	2.134x 7.315
1924	3	5	34	15	3	16	76	2.134x 7.925
1928	3	5	31	17	3	22	81	2.000x13.000

The manufacturing process is, in general, the dry process, but the wet process is being adopted by the newly established factories. The scale of the factory has doubled in these five years as seen in the above table, and it is also shown by the change of size of rotary kilns and tube type mills in Table II.

The recovery of waste heat from the rotary kiln was adopted first in 1920, and there were, in 1927, 43 waste heat boilers of total heating surface 32,544 sq. m. and 29 turbo-electric generators of total capacity 54,410 kw., corresponding to nearly 80% of power used in the industry (Ref. Dr. S. Kasai's paper "Waste Heat Recovery in the Japanese Cement Industry," in Section P of the London Sectional Meeting of the World Power Conference, 1928).

There are three associations in the industry. The first, the Japanese Portland Cement Engineers' Association, was organized in 1900. On the recommendation of this association, the Japanese Standard Specification for Portland Cement was first issued in 1905 from the Government, and it was revised in 1913, 1919 and 1927. The latest specification was issued in April, 1928, as Japanese Engineering Standards JES 28.

The quality of cement has been remarkably improved year by year, especially in these three years.

Studies on Laitance of Cement Mortars and Concrete. In the present paper there are reported the results of latest studies on chemical compositions of laitance formed on cement mortars or concrete works. Two samples of Japanese portland cements and one Japanese standard silica sand are used. The chemical compositions and physical properties of these samples are examined as shown in the accompanying tables.

PHYSICAL PROPERTIES OF PORTLAND CEMENTS

	True density	True density (Ignited)	Apparent density	Void	Fineness: M/cm.² 900	2500	4900
Cement A	3.15	3.21	1.619	48.6%	0.02%	0.20%	1.08%
Cement B	3.15	3.17	1.679	47.6	0.02	0.40	2.20

CHEMICAL COMPOSITIONS OF PORTLAND CEMENTS

	Loss on ignition	Insol. residue	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	SO_3
Cement A, %	0.89	0.82	23.05	6.22	3.52	63.15	1.55	1.05
Cement B, %	0.57	0.77	20.97	6.34	2.79	64.82	1.40	1.44

PHYSICAL PROPERTIES OF JAPANESE STANDARD SAND

Void	Fineness: M/cm.² 64	144	225	Pass
37.7%	1.34%	98.10%	0.42%	0.10%

Samples of laitance were prepared by kneading cement or cement and sand (1:2) with water in various water-cement ratios from 30% to 90% and the laitance produced on the surface of mortars were scraped layer by layer to seven fractions *a*, *b*, *c*, *d*, *e*, *f* and *g*. The percentages of the sum of *a*, *b*, *c* and *d*, or *a*, *b*, *c*, *d*, *e*, *f* and *g* are nearly 0.2-0.4% of the cement in the former case, or 0.5-0.7% in the latter one.

These samples of laitance and the cement are compared by their chemical compositions of total analysis or principal hydraulic constituents as silica, alumina, ferric oxide and lime, and their moduli and indices as hydraulic modulus, silica modulus, index of activity, iron modulus, etc., as in the following tables:

The fractions *a*, *b*, *c* and *d* are considerably high in (1) loss on ignition, (2) carbon dioxide, (3) lime, (4) sulphuric anhydride and poor in (5) silica. These deviations from the cement used are more clearly observed in indices and moduli. Laitance *a* is chiefly composed of calcium carbonate produced by carbon dioxide in air and alkaline water of calcium hydroxide which is the hydration product of cement. These four fractions *a*, *b*, *c* and *d* are assumed to be the laitance proper and the other fractions, *e*, *f*, and *g* are to be the hydrated compounds in the hydration of cement and the mixture of free silica particles from the sand and impurities as seen in the insoluble residue.

Electrical Method of Measuring the Setting Time of Portland Cement. The change in electrical resistance which occurs during the setting and hardening of portland cement has been measured for the purpose of determining the setting time. Effect of temperature on the rate of setting has also been studied. The author, Yosomatsu Shimizu, describes the apparatus and procedure, concluding that the electrical method is more accurate than the common mechanical or thermal methods in use and also is better adapted for use.

Studies on Mixed Portland Cements. The mixed portland cement industry in Japan is on a small scale. There are two sorts of mixed portland cements, the one being blast furnace slag cement and the other being "soliditit" cement.

The author studied first the principles of the manufacturing process of "soliditit" (Japanese Patent 42160) and modified the process by adding one more admixture of siliceous nature. This new mixed portland cement is named "Neo-soliditit" and has just been patented (Japanese Patent 80692). The "Neo-soliditit" is an early-high-strength cement, which is comparable to superior foreign early-high-strength portland cements.

VARIOUS INDICES AND MODULI OF CEMENT AND LAITANCE

No. of sample	Hydraulic modulus	Silica modulus	Index of activity	Iron modulus
Cement A	1.93	2.37	3.70	1.77
Laitance a	......	......	......	......
Laitance b	2.57	1.33	2.17	1.58
Laitance c	2.12	2.12	3.60	1.43
Laitance d	1.78	1.63	2.42	2.04
Laitance e	1.58	3.22	5.12	1.70
Laitance f	1.39	2.65	4.23	1.68
Laitance g	1.39	3.47	6.54	1.13

The strength of the "Neo-soliditit" mortars increases on a long aging and it has reached to about 800-900 kg/cm² of compressive strength and 50-60 kg/cm² of tensile strength at the curing age of 13-26 weeks.

Neo-soliditit is composed of three components, (1) 70-75% portland cement clinker, (2) 10-20% calcined product of granite, basalt, andesite, etc., and (3) 10-20% natural or artificial siliceous matter, containing much soluble silica, alumina and ferric oxide. These three components are mixed and ground with 3-5% of gypsum to a fine cement.

Calcium Aluminates and Their Hydration. Continuing the previous study made on the formation of synthetic calcium aluminates and their hydration products, the authors found that $5CaO{\cdot}Al_2O_3$ sintered at 1400 deg. C. and melted at 1450 deg. C. Free lime and free alumina disappeared and the molar ratio of combined lime to alumina nearly reached the theoretical value of 1.667 ($5CaO:3Al_2O_3=5:3$).

Combination of CaO and Al_2O_3 to form $CaO{\cdot}Al_2O_3$ at above 1300 deg. was observed. The $CaO{\cdot}Al_2O_3$ sintered at 1500 deg. C. and melted at 1600 deg. C. Molar ratio increased to the maximum of 1.23 at 1350 deg. C., and then decreased to nearly the theoretical of 1.0.—*Schoichiro Nagai and Ryuichi Naito.*

Mixed Portland Cements (Neo-Solidits). Admixtures of silceous nature as blast furnace slag, clay or alumite extraction residues (Si-material), etc., were mixed with a second class of siliceous materials of which kieselguhr, diatomaceous earth, etc., are typical. This mixture (25-30 parts) was ground with cement clinker (70-75) to make a "mixed" portland cement and physical strength tests run on this cement. Comparison with other cements shows the mixed portland cement, termed "neo-solidit," to be an early-high-strength cement quite in line with these types insofar as hardening qualities are concerned.—*Schoichiro Nagai.*

Acid-Proof Cement Mortars. The effect of various commercial admixtures were studied and compared. The physical and chemical compositions of these admixtures are given.—*Schoichiro Nagai.*

RECALCULATED VALUES OF MAIN CONSTITUENTS OF CEMENT AND LAITANCE

Number of sample	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	SO
Cement A	23.38%	6.31%	3.57%	64.08%	1.57%	1.06%
Laitance a	tr.	tr.	tr.	100.00	tr.	tr.
Laitance b	14.87	6.83	4.31	66.93	2.69	4.29
Laitance c	20.35	5.65	3.96	64.93	1.71	3.38
Laitance d	21.34	8.82	4.30	61.19	1.53	2.81
Laitance e	28.26	5.52	3.24	58.60	1.78	2.57
Laitance f	29.31	6.93	4.13	56.27	1.70	1.66
Laitance g	31.26	4.78	4.22	55.96	1.62	1.64

CHEMICAL COMPOSITIONS OF CEMENT AND LAITANCE

Number of sample	Loss on ignition	CO_2	Insoluble residue	SiO_2	Al_2O_3+ Fe_2O_3	CaO	MgO	SO_3
Cement A	0.89%	—%	0.82%	23.05%	9.74%	63.15%	1.55%	1.05%
Laitance a	44.00	39.78	tr.	tr.	tr.	55.55	tr.	tr.
Laitance b	42.54	31.45	0.83	8.35	6.29	37.57	1.51	2.41
Laitance c	39.13	29.01	1.48	12.09	5.71	38.57	1.02	2.01
Laitance d	33.64	28.36	1.83	14.19	8.73	40.68	1.01	1.87
Laitance e	31.91	24.96	3.83	19.28	5.98	39.98	1.22	1.76
Laitance f	23.85	20.15	4.76	23.76	8.97	45.63	1.38	1.35
Laitance g	17.13	13.22	5.26	27.45	7.85	48.68	1.41	1.42

Some Pointed Remarks for Producers of All Rock Products

Made in an Address to Eastern Lime Manufacturers

By Norman G. Hough

President and General Manager of the National Lime Association

AT A RECENT MEETING of industrial leaders of the United States, called by President Hoover, I was amazed at the confidence with which those men are moving in on next year's programs. Industry after industry reported earnings sufficient to warrant huge expenditures for repairs, betterments, replacements and general expansion. The publication of these optimistic reports was a real factor in averting what might have been a national calamity. That is reserve.

Must Accept New Theories

Unfortunately the lime industry has no such reserve and therefore could not make a similar report. We cannot help to chart the course nor take our rightful place in the great constructive program now being organized. We must follow in the wake of the passing parade. And all this because of ourselves; because we have failed to take that profit which is ours as a matter of right and as a matter of public interest; because we have not accepted the new philosophy and the new theory of American business; because we have refused to accept that which is inevitable, namely, that before we can do justice to ourselves and to the stockholders whom we represent we must be willing to solve our district problems in conjunction with our competitors. As I have often stated, the time has gone when anyone, no matter how strong and powerful, can stand alone against the influences which, although designed constructively in the interest of other industries, tend to destroy our own.

During the calendar year of 1928 the average price of all lime sold in the United States declined 57c. per ton. This was a distinct loss to the industry of $2,541,000, because reductions were made not as a result of lower cost of operation, but from a further paring of the already small net profits. In general, conditions have not improved this year (1929); in fact, nearly all districts have suffered further declines—and it still continues to come out of net profits, if any.

I do not hesitate to say to the lime industry that it cannot be so reckless with its funds. The intelligent expenditure of just a small fraction of the $2,541,000 squandered last year would go a long way toward protecting this industry against invasion by outsiders. In these days of changed economic conditions the industry which does not spend money for self-advancement is bound to perish. We are shaping our own destiny.

Business today is done under a relatively new theory. The old theory was to grab everything possible today and let tomorrow take care of itself. Volume of production was the big idea. Today, creation of demand is the underlying thought; production is secondary. The successful industries of today are the ones which have mobilized to build the strongest possible consumer demand and then supply that demand at the lowest possible cost consistent with the service rendered.

Norman G. Hough

Many business men are still endeavoring to operate in the old fashioned way. Time will enlighten them—but the sheriff may cheat time out of its job.

Improper Merchandising Exacts Its Toll

While on this subject I might add that one of the greatest difficulties in our industry is that we are not merchandizing our goods. Failure to sell our goods successfully is extracting a terrific toll. It is causing us to lose at both the bung and the spigot.

There are people in the industry who still think that one can take everything out and put nothing in. They are unwilling to create anything. They belong to the small minority who are averse to joining any constructive plans for development. To them I say there is no room in industry today for the non-creative sellers. They are bound to go. They will eliminate themselves, and when they go they will blame everyone but themselves.

The successful sellers of today and tomorrow are the creative, profit-minded sellers. They exemplify all of the fundamental principles of efficient, aggressive salesmanship. They are keen students of economics; they study the uses and applications of their products; improve their merchandise; invent new uses and broaden their markets; create new ideas; develop new policies; build good will; they eliminate waste and they make a profit. They are merchandizers; master builders of business.

Creative Minds Must Rule

Those in the industry who are creative and profit minded cannot, in justice to themselves and their stockholders, permit the non-creative type to dominate. You cannot abandon constructive efforts. You must go on building. Competitive industries make their greatest progress when the constructive element becomes discouraged and discontinues. Let no one become discouraged with apparent failure or set backs. They can only be temporary. An indomitable spirit will win.

Let us remember that it is good business to take a temporary loss for a permanent gain. Therefore I recommend that no one become disheartened but push on to the point where he can go forth with a winning merchandizing program. What this industry needs most is leadership. When the leaders despair, the industry is doomed.

It is just as easy to operate an industry on a profitable basis as it is to operate at a loss. It requires only more courage and a greater display of confidence. Confidence in our industry must be restored. Let each recognize that so far as profits are concerned we have nothing but zeros or even less. There is no profit, and, as Charles F. Abbot has said, a million times nothing is nothing. Therefore, let us take our minds off tonnage and get them on profits. We know the plan we have been following has spelled failure. We have all failed dismally in our purpose.

No superior intelligence is required to determine the destination to which present methods will carry us. Let us then try the only plan that has a chance of being successful—that of co-operation based upon the most necessary of all things—confidence, but in doing so let us bear in mind that results will accrue only as every man purposes in his own heart.

Confidence can be re-established if we recognize these things and resolve today to do our share in developing a condition of stability. Let each of us conduct ourself in a way which will permit our individual companies to earn a profit. The return of confidence will be remarkable—and from there on our problems will be easy. In order to keep step with progress we must build on a firm foundation of confidence and co-operation. No other will endure.

In concluding, may I add that in this discussion it has been my purpose to arouse within you a full recognition of the dangers with which this industry is confronted, and of the newer principles which must guide us in our conduct of business. In so doing I go further and say that this industry will not be headed in the right direction until we get on a profit-making basis. Profit is the very foundation of society. Profitless prosperity is as much to the detriment of public interest as to the manufacturers, therefore I take a definite stand for prosperity of a substantial character.

While the public is today emphasizing the elimination of waste, it is not demanding that we sell our goods below cost. It does insist on our products being correctly priced, based upon efficient production and distribution. If I have been able to bring you a step closer to a recognition of these public opinions, and you are ready to begin working in that direction, then I will feel that this meeting has been justified.

The Use of Lime in Medicine and Pharmacy*

By Alfred B. Searle

Consulting Adviser to the Lime, Cement and Clay Products Industries, London, England

THE *medical uses* of lime include the manufacture of *lime syrup*, which is used as an acid-corrector and bone-builder, the manufacture of *calcium-tannate*, which is used as a cure for dysentery, and the manufacture of *calcium sulphonate*, which is used against night-sweats. There is considerable evidence that *lime-dust* is effective in the treatment of tuberculosis. Professor Coutiere has reported to the French Academy of Medicine that 40% of the tuberculosis cases in which lime treatment has been tried have resulted in complete cures. The chemical, bacteriological and radiological results are all said to be equally striking in this method of combating this dread disease. While the experience of quarrymen tends to skepticism as to many cures being effected from inhaling limestone dust, it is generally believed that lime can stop the spread of the disease by surrounding the diseased section with a calcareous coating. Other producers assert that many of their employes have come to their plants suffering from tuberculosis troubles and in a short time recovered their health and strength and remained on their jobs for years afterwards. Still others say that the men who work in lime plants are unusually healthy and noticeably free from disease.

Soluble Salts More Effective

General medical experience seems to show that soluble calcium salts are more effective than hydrated lime (quicklime cannot be used, as it is corrosive) and of these calcium chloride is the most extensively used in Germany, though it has a very unpleasant taste which is only partially disguised by the addition of saccharin in the proportion of 3 parts per 1000 of calcium chloride solution. Mineral oils are purified with lime in making *salves*.

Lime Water Medicaments

Lime in the form of *lime water* is used:

(i) In the treatment of sour stomachs and skin diseases.

(ii) To counteract acidity in foods, especially milk, making finer curd which is easily digested.

(iii) To allay vomiting.

(iv) As an astringent in diarrhoea, though usually, for this purpose, lime water is too weak, but chalk mixture is useful.

(v) As an anti-acid and for the soothing action on the bowels, though chalk mixture is preferable, as it is stronger.

(vi) When mixed with an equal quantity of linseed oil, lime water forms *carron oil*—a useful application for burns and scalds, though now largely replaced by picric acid solution. *Linimentum Calcis* is a similar mixture of lime water and olive oil.

(vii) Lime water is used for preparing Argenti Oxidum, Linimentum Calcis, Lotio, Hydrargyri Flava and Lotio Hydrargyri Nigra.

Lime water for medicinal purposes is made, according to the British Pharmacopoeia, by shaking washed slaked lime with 100 times its weight of distilled water and siphoning off the clear liquid. It is to be kept in green glass bottles.

Lime Syrup (Liquor Calcis Saccharata) is made by shaking slaked lime with twice its weight of sugar and 20 times its weight of water and siphoning off the clear liquid.

Calcis Hydras is the pharmaceutical name for slaked lime made from a calcium lime "yielding only the slightest reactions characteristic of iron, carbonates, chlorides, sulphates or silica," but may apparently contain magnesia and alumina. It must not contain more than 20 parts of lead or 5 parts of arsenic per million.

Slaked lime mixed with caustic potash forms Vienna paste, which is used to destroy warts and other small growths.

The medicinal value of *lime in food* has been explained earlier.

Lime is sometimes used in the preparation of various hypophites and other salts, though these are generally prepared by indirect means.

It need hardly be stated that for medicinal purposes a pure lime should be used, and as it cannot be used in the unslaked state, a carefully-prepared hydrated lime is usually the best and most convenient form in which to use it. Grit is objectionable, but is not excluded by the official tests! Grit is seldom found in good hydrated lime.

*From *The Stone Trades Journal*, London, England.

Ohio Finishing Lime Association Grows

THE Washington Building Lime Co., Baltimore, Md., is now a member of the Finishing Lime Association of Ohio. The Washington Building Lime Co. is one of the oldest producers of finishing hydrated lime, and operates a modern 32-kiln plant at Woodville, Ohio.

The addition of this firm to the Finishing Lime Association of Ohio strengthens the association and places it in a very strong position, it now representing about 80% of the finishing lime tonnage.

The association is comprised of the leading manufacturers of finishing hydrated lime, who are as follows:

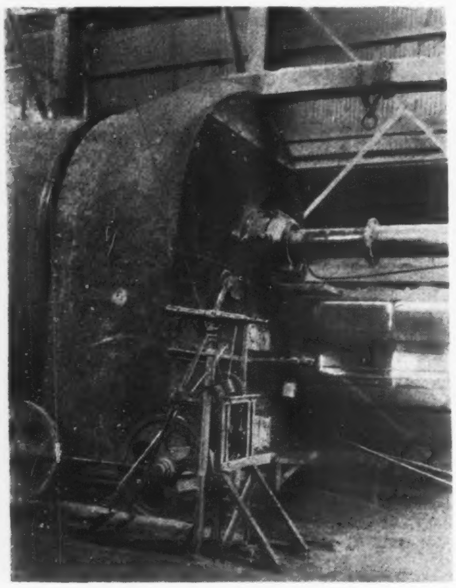
The Kelley Island Lime and Transport Co., Cleveland, Ohio.
The Gibsonburg Lime Products Co., Gibsonburg, Ohio.
The National Lime and Stone Co., Findlay, Ohio.
The National Mortar and Supply Co., Pittsburgh, Penn.
The Ohio Hydrate and Supply Co., Woodville, Ohio.
The Woodville Lime Products Co., Toledo, Ohio.
The Washington Building Lime Co., Baltimore, Md.

The association has been in operation for a period of three years, operating on a national scope through district field offices.

Hints and Helps for Superintendents

Telescope for Reading Draft Gages

THE indicating draft and temperature gages for controlling the kilns at the Bellingham, Wash., plant of the Olympic Portland Cement Co., are mounted at considerable elevation above the burner floor and on the flue gas stack. The distance is



Telescope at the kiln burner's station to read distant gages

so great that the burner cannot see the gages with the naked eye, so a 2½-in. telescope has been provided which is permanently and solidly mounted as shown. The telescope makes it very easy to read the different gages. When not in use the lens of the instrument is covered with a leather hood.

Controlling the Consistency of Cement Slurry

By D. R. WILLIAMS
Chief Chemist, Monolith Portland Midwest Co., Laramie, Wyo.

WE HAD difficulty in controlling the consistency of our slurry when using rock from different parts of the quarry. Due to the character of the rock and shale the percentage of water varies as much as 5% in slurry having the same fineness and consistency.

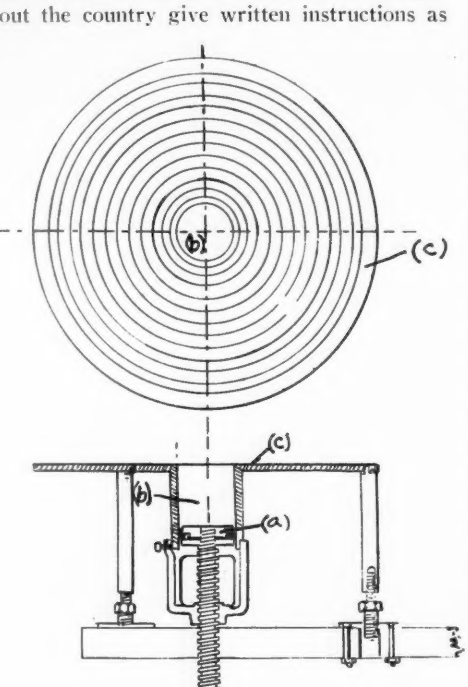
To control the percentage of water in the slurry we have made in our own machine shop an apparatus similar to the Southard viscosimeter. By making a series of determinations it is now possible to control the consistency of the slurry and to anticipate the minimum per cent of water to be added. This uniform consistency of the slurry enables us to get the maximum output from the kiln. The normal consistency of the slurry is determined by the capacity of the pumps.

The operation of the viscosimeter is very simple. The piston (a) is lowered to a given point in the cylinder (b) and the slurry poured into the well until it is flush with the top of the plate (c). Then the crank (d) is turned until the top of the piston is even with the plate top. The overflow on the circular plate (c) is measured by the average quadrant readings on the concentric circles.

Vibrating Screen Discussions

By CHARLES JENKINS
Angels Camp, Calif.

MANY OF the large manufacturing companies of screening equipment throughout the country give written instructions as to the setting up, maintenance and other valuable data relative to their product. When called upon for advice as to what degree of angle to set a screen to handle a given tonnage and to efficiently separate the desired sizes the manufacturer's usual answer is that it all depends upon the size of material to be screened, the amount of tonnage to be handled, etc.



Slurry viscosimeter to control consistencies

After years of perplexing problems I have come to the conclusion that there is no set rule from which to work, and that the many angles of screening various characters of rock must be solved by those doing the actual work.

For example, in the screening of granular rock used for the purpose of making mineral surfaced roofing rock, a screen set at an angle of 20 deg. from horizontal will very efficiently handle a given tonnage of the finished product, but raise the screen to 25 deg., and the percentage of fines remaining in the product will increase from 5 to 10%. On the other hand, lower the degree of angle to 15 deg. and the fines remaining in the finished product will decrease correspondingly. Therefore the degree of angle at which a screen is set regulates the size of material made to a certain extent, and holds good up to a point where it is made necessary to change the screen cloth.

Many men in charge of crushing plants run into some perplexing problems in trying to force a vibrating screen into handling a tonnage that it is impossible for it to do and get results. If the flow of material passing over a screen is piled up an inch deep there are some of the proper sized particles that never touch the screen cloth let alone pass through it. To get excellent screening a screen must be set at an angle to get perfect results but not so steep that it becomes a chute. Nor should it be so flat as to cause the material to pile up on the screen to a depth so deep that only the particles that come in contact with the cloth go through, the rest riding, rock on rock, over the entire length of the screen. This last makes it necessary for particles of the proper size to be sent through the circuit again and again, to be finally ground into fines or dust, which constitute the big loss in fine crushing plants.

Many plants operating modern vibrating screens are experiencing costly ripping and tearing of the screen cloth. This costly item is due to forcing a screen to handle a tonnage it was never made to handle. More

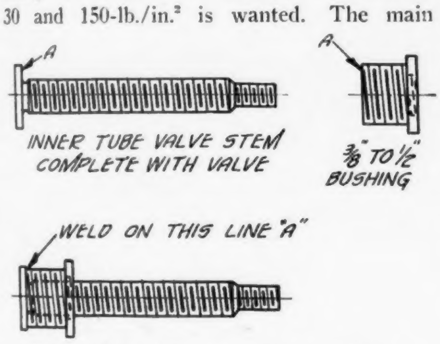
and more vibration is put to the screen cloth, until it reaches a point where it rips or tears, and on many occasions filling the finished product with oversized rocks, which involves a big expense to rescreen the product. A screen cloth is more likely to rip or tear when no load is on it, such as when starting or stopping the unit. This can be eliminated to a great extent by not expecting a screen to handle all the tonnage you can run over it, but to give it a fair load, with the screen set at the proper angle to carry this load, with the minimum amount of vibration necessary for perfect results.

Many companies are spending a lot of money trying to make one screen do the work of two, and all they realize out of it is a dirty product and unsatisfactory results.

Air Valve Which Gives Pressure Readings

By J. PALMER CAMM
Watonga, Okla.

THE ACCOMPANYING sketch shows an air valve which can also be used to give pressure readings in places where a fairly close pressure reading, of between 30 and 150-lb./in.^{2} is wanted. The main



Air valve gives pressure readings

use that we have found for it is on a portable air compressor. Previous to our placing this in use we could not keep the ordinary pressure gage reading accurately because of the vibration of the machine, causing wear in the working parts of the gage. It was necessary for us to replace this gage often.

The valve as shown above consists of an ordinary automobile inner tube valve stem complete with a valve and a 3/8-in. by 1/2-in. bushing welded together as shown in sketch, so that should the vibration of the air compressor break the weld there is no danger of the valve stem being blown off and perhaps cause an accident. A pressure reading can be obtained with an ordinary tire pressure gage such as is used at any garage. We have had this in use for over two years, and have not yet had to replace the valve.

Tractor for Spotting Cars

THERE may be nothing particularly interesting or novel about the use of tractors for spotting empty cars, but their convenience and handiness for other work

The tractor is useful in spotting cars

is often overlooked. In fact, the operators at the crushing plant of the Olympic Portland Cement Co., near Sumas, Wash., use the tractor more for pulling back any part loads that might have skidded on by the loading chute than for spotting the empties as the track has been graded so that they roll down by gravity.

Oil House Construction

THE Idaho Portland Cement Co. plant at Pocatello, Idaho, was built as economically as possible with the idea to get cement production as cheaply as possible after which its own cement could be used to construct silos and otherwise beautify the plant.

The oil house construction is illustrative of how good material was used for rough construction purposes, later to be arranged in a more orderly manner. The hollow tile were not laid in mortar but 2x4's were passed through the core spaces so as to act as reinforcements and to tie the tile units together. A few vertical side braces and the building was completed. Later the 2x4's can be removed, the tile laid up with mortar, faced with concrete, if it is so desired, and a real neat oil house built from material used in the one shown and without damage to the tile during the wrecking process.

The oil house before covering with cement stucco

Retarder Hopper

THE illustration shows how one western mill has solved the problem of insuring the presence of retarder in its retarded plasters. The device consists of a small pan mounted on the stucco hopper and so connected that the stucco cannot

Arrangement which insures addition of retarder to plaster before stucco hopper can be dumped

be dumped to the mixer until the pan has been tilted downward by the weight of the retarder placed within it. The little finger to which the chain is attached as shown, after the pan has tipped, swings over and completely empties the retarder into the plaster. Reversing the operation, this finger brings the retarder pan up to its original position.

This device could be used, not only in the gypsum plants, but in any of the industries where mixing two or more ingredients is necessary.

Patching Cotton Sacks

IN the Pacific Northwest the practice of glue-patching of sacks is quite common and is used by most of the portland cement plants in that section.

Only cotton sacks and those with small holes are patched by this method which consists of merely pasting a cotton patch on to the sack using a good grade of cooper's glue that is kept hot by suitable hot water baths.

It is claimed that the method is just as satisfactory as the sewed patch and very much faster.

Your 1930 Business; Where Is It Coming From; and How?

Time to Begin Budgeting Production and Studying Markets— Part I of a Series of Editorial Discussions of Marketing Problems

A YEAR AGO, in our annual review issue (December 22, 1928), was an editorial article on "Market Analysis and Budgeting Production and Sales"; suggesting more accuracy in predicting market demand, planning profitable operation on part capacity where it was obvious full capacity would not be demanded, urging the establishment of building-material, co-operative, statistical bureaus as a means for assembling and distributing data necessary for predicting demand and prorating production. We have ample evidence that our suggestions were widely read, criticized and complimented.

During all the year 1929 we were pursuing our inquiries and receiving many helpful suggestions from men prominent in the industries. For our annual review issue for 1929 (published January 4, 1930) we promised many of our reader-friends a continuation of the discussion based on suggestions and data they had supplied. The truth is that the material gathered in this connection is so voluminous and so meaty that we simply could not find time to digest it, nor space to publish it, in connection with our annual review issue. So we are going to publish it in small doses, as nearly continuously as possible, in several successive issues.

Basis for Discussion

We submitted the basis of our discussion to a number of leaders in the rock products industry somewhat as follows: Briefly there seem to be four cardinal principles involved; (1) sales below cost; (2) specific definable sales territories; (3) determination of market capacity in such sales territories; (4) curtailment of production when necessary by rules of equity in the interests of *(a)* the public; *(b)* the industry; *(c)* the competitors, their employes and stockholders. If it is an established principle that selling below cost under any circumstances—even to reduce present costs—is a wrong policy, each plant in the industry will have a specific sales territory defined by freight rates or transportation costs. Competitors will then know fairly definitely who their competitors are, or will be, and about what the competitive prices will be. Then much of the confusion and waste in present sales methods could be eliminated if each plant organization would govern its production in a general way by the market capacity of its legitimate sales territory.

An equitable way to control or curtail production under our national and state anti-trust laws is extremely difficult of attainment. The public is entitled to free competition in service and quality at fair prices. The industry is entitled to fair returns or living profits for plants that give quality and service at fair prices. Competitors are entitled to ethical and fair competition, but not, of course, to the protection of inefficient, obsolete, high-cost plants. All these things are necessary not merely as sound public policy, but to the healthful progress of the industry itself, or it will lose out as a whole to a competitive industry.

How Do You Guide Your Production Schedule?

Now then, do you attempt to guide your production schedule by advance market analysis? If so, what kind of an organization do you use for this specific purpose? Your own, or outside experts? What statistics do you use and how do you use them? How do you determine what is your fair share of the business available? Many interesting and instructive answers have been received in reply to these letters. They are all confidential, so far as names of individuals and companies are concerned; but in this and future issues we shall endeavor to digest them and pass on the thoughts and suggestions they contain to the industry.

The problems of distribution and sales are involved and intricate. Much more space in literature and thought has been given to problems of operation and production. But over-capacity and the attempt to keep all industry on an even keel is compelling all business men and industrial executives to give more thought—perhaps most of their thought at present—to finding solutions to this pressing problem of eliminating waste in sales and distribution, for economies in sales and distribution must go hand in hand with economies in operation and production, or expected and justified profits from the latter are dissipated instead of saved.

The attempt of producers to seek a solution, or a part solution, through codes of ethics, or codes of fair business practice, is only one phase of the situation. Stripped of all their customary technicalities, codes of fair business practice merely attempt to accomplish indirectly by roundabout methods, by an appeal to the intelligence and integrity of business men, what could be much more readily and directly accomplished by intelligent and honest business through pools, price-fixing, division of territory, prorating production, etc., were it not for our anti-trust laws. These things are prohibited because they have been abused in the past, and are subject to abuse at any time, by any organized, short-sighted and unnecessarily selfish group

(Continued on the following page)

Editorial Comment

(Continued from preceding page)

in business. There is not much chance that these prohibitory laws will soon be changed, no matter how "good" business becomes, since judging by other laws, such as the 18th amendment, it is the habit of the law-making bodies in this country to prohibit everything that is capable of abuse—as if the prohibition in itself was sufficient.

A solution must therefore be found within the law, by developing intelligent understanding of the economic and business principles involved, and in relying eventually on the universal intelligence or enlightened selfishness of individual business men to accomplish results. Here, of course, codes of fair business practice are helpful as a medium of educating and arousing the intelligent interest of business men; but they are not in themselves a cure-all for the ills of industry, nor are they of very much specific assistance in solving the problems of sales and distribution and of part-capacity production on a fair and equitable basis. And they are of the customary prohibitory character instead of a direct appeal to the selfish—the intelligently selfish—interests of the individual business man.

The next of this series will deal with sources and kinds of statistics available for budgeting sales and distribution.

Accomplishments of the Lime Association

The National Lime Association has closed a most successful year from the standpoint of actual accomplishments. It entered the year of 1929 emerging from a reorganization and has since moved along sound lines, re-establishing itself in a position of confidence among lime manufacturers throughout the country, increasing its membership considerably, both in number of members and tonnage represented.

One of the important accomplishments during the early part of the year was its work towards the end of "killing" House Bill No. 43 in Congress proposing an amendment to the standard lime barrel law of 1916. The amendment, had it become law, would have worked untold hardship on lime manufacturers. The National Lime Association, as well as many individual manufacturers, registered such strong objections, all sound in character, that the bill died in the senate committee.

Another important phase of the National Lime Association's work was to influence manufacturers to group themselves together by districts under "Statistical Bureaus" for the purpose of developing statistics which provide manufacturers with facts relative to sales and shipments of lime products. There were in operation at the close of the year four statistical organizations. Realizing the importance of having the industry operate on a basis of facts rather than guesswork, the National Lime Association is continuing its activity to have more of these statistics developed so that eventually figures will be received monthly from all districts.

Not the least important and constructive development during the year was the Trade Practice Conference held by the lime industry under the auspices of the Federal Trade Commission. The work involved in holding the Trade Practice Conference, except that actually done by the Federal Trade Commission, was done by the National Lime Association. The rules of practice adopted, by resolution, at a meeting June 27 were returned to the industry October 25, with the approval of the commission, after some changes, as noted in ROCK PRODUCTS, November 9.

The association during the year resumed its work, suspended two or three years ago, of co-operating with building code committees throughout the country looking towards the establishment of lime products in new building codes for such uses as the character of the material merits. This work has gotten under way only recently, but rapid progress is being made.

There is every reason to believe that if lime manufacturers will get fairly and squarely behind the program prepared by the association's able president, Norman G. Hough, the industry will share well in the building program of 1930. Lime manufacturers, in their present state of lethargy, are their own worst enemies.

Safety, First, Last and Always

A friend reader, obviously more interested in technical articles than those of management and human relations, tells us ROCK PRODUCTS is "a very laudable and worthy journal, notwithstanding the safety first heroes' innumerable photographs" which are published. The editors confess that they do devote a large amount of valuable space to "safety first"—space that they sometimes would like to use for good articles that have been awaiting publication these many weeks—sometimes, sad to relate, months.

ROCK PRODUCTS is for safety in operation and production, first, last and always, not merely because of its humanitarian considerations, its savings in operating costs, its savings in labor turnover, and all its other economic consequences. For safety work does a great deal more for industry than all these. It induces more intimate relationships between employers and employes and makes better workmen of both, better men, and is one of the things that makes work and industry a joy instead of a burden. Future industrial executives trained in schools for promoting safety are going to be human and understanding executives; and are going to arrive at solutions of problems of human engineering, or scientific management, or whatever you care to term it, a whole lot quicker and easier than the passing generation of hard-boiled executives.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

Stock	Date	Bid	Asked	Dividend
Allentown P. C. 1st 6's[29]	1-13-30	85		
Alpha P. C. new com.	1-11-30			75c qu. Jan. 15
Alpha P. C. pfd.	1-11-30	110		1.75 qu. Dec. 14
American Aggregates com.[29]	1-13-30	15	20	75c qu. Mar. 1
Amer. Aggregate 6's, bonds	1-10-30	85		
American Brick Co., sand-lime brick	1-13-30		12½	25c qu. Feb. 1
American Brick Co. pfd., sand-lime brick	12-13-29		80	50c qu. Feb. 1
Am. L. & S. 1st 7's[33]	1-13-30	96	97	
American Silica Corp. 6½'s[49]	1-14-30	90	100	
Arundel Corp. new com.	1-13-30	41½	42	75c qu. Jan. 1
Atlantic Gyp. Prod. (1st 6's & 10 sh. com.)[10]	1-14-30	No market		
Atlas P. C. com.[2]	1-11-30	32	36	50c qu. Dec. 2
Beaver P. C. 1st 7's[20]	1-10-30		100	
Bessemer L. & C. Class A[4]	1-10-30	29	30	75c qu. Nov. 1
Bessemer L. & C. 1st 6½'s[4]	1-10-30	89	91	
Bloomington Limestone 6's[29]	1-13-30	85	87	
Boston S. & G. new com.[47]	1-13-30	17	20	40c qu. Jan. 1
Boston S. G. new 7% pfd.[47]	1-13-30	47	50	87½c qu. Jan. 1
Calaveras Cement 7% pfd.	1-10-30	82½	87	1.75 qu. Jan. 15
Calaveras Cement com.	1-10-30	12½	14	
Canada Cem. com.[43]	1-10-30	17⅞	18	
Canada Cement pfd.[43]	1-10-30	93		1.62½ qu. Dec. 31
Canada Cement 5½'s[43]	1-10-30	98½	99	
Canada Cr. St. Corp. 1st 6½'s[43]	1-10-30	95	99	
Can. Gyp. & Alabastine (new)	1-13-30	23½	23¾	37½c qu. Jan. 2
Certainteed Prod. com.	1-13-30	12½	13¼	
Certainteed Prod. pfd.	1-13-30	27¼	50	1.75 qu. Jan. 1
Cleveland Quarries new st'k	1-13-30	69	70	75c, 25c ex. Dec. 1
Columbia S. & G. pfd.	1-10-30	85	95	
Consol. Cement 1st 6½'s, A	1-14-30	75	85	
Consol. Cement 6½% notes[21]	1-14-30	80	90	
Consol. Cement pfd.[29]	1-13-30	50	60	
Consol. Oka S. & G. 6½'s[12] (Canada)	11-23-29	98	100	
Consol. Rock Prod. com.[41]	1-10-30	3	5	
Consol. Rock Prod. pfd.[41]	1-10-30	12½	13½	43¾c qu. Dec. 1
Consol. S. & G. com. (Can.)	11-18-29	15		
Consol. S. & G. pfd. (Can.)	1-13-30	82	84½	1.75 qu. Nov. 15
Construction Mat. com.	1-14-30	14½	15¾	
Construction Mat. pfd.	1-14-30	39	40	87½c qu. Feb. 1
Consumers Rock & Gravel, 1st Mtg. 6's, 1948[18]	1- 9-30	93	97	
Coosa P. C. 1st 6's[20]	1-13-30	50	55	
Coplay Cem. Mfg. 1st 6's[40]	1-11-30	90	....	
Coplay Cem. Mfg. com.[40]	1-11-30	10	....	
Coplay Cem. Mfg. pfd.[40]	1-11-30	70	....	
Dewey P. C. 6's (1942)	1-14-30	97	....	
Dewey P. C. 6's (1930)	1-14-30	97	....	
Dewey P. C. 6's (1931-41)	1-14-30	97	....	
Dolese & Shepard	1-13-30	78	82	$2 qu. & $1 ex. Jan. 2
Edison P. C. com.[39]	1-10-30	10c	....	
Edison P. C. pfd.[39]	1-10-30	25c	....	
Giant P. C. com.[2]	1-11-30	15	25	
Giant P. C. pfd.[2]	1-11-30	20	30	3½% s.-a. Dec. 16
Ideal Cement, new com.[33]	1-13-30	58	61	50c spec., 50c ex. Dec. 21 & 75c qu. Jan. 1
Ideal Cement 5's, 1943[33]	1-13-30	97	99	
Indiana Limestone com.[29]	1-13-30	2	5	
Indiana Limestone pfd.[29]	1-13-30	50	....	
Indiana Limestone 6's	1-13-30	69	70	
International Cem. com.	1-13-30	57	57¼	$1 qu. Dec. 31
International Cem. bonds 5's	1-13-30	94½	95	Semi-ann. int.
Iron City S. & G. bonds 6's[8]	11-15-29	80	....	
Kelley Is. L. & T. new st'k	1-13-30	40	43	62½c qu., 50c ex. Jan. 1
Ky. Cons. St. com. Voting Trust Certif.[48]	1- 9-30	12	13	
Ky. Cons. Stone 6½'s[48]	1- 9-30	94	100	
Ky. Cons. Stone pfd.[48]	1- 9-30	90	95	
Ky. Cons. Stone com.[48]	1- 9-30	12	13	
Lawrence P. C.	1-11-30	57	63	$1 qu. Dec. 28
Lawrence P. C. 5½'s, 1942	1- 8-30	84	90	
Lehigh P. C.	1-13-30	34½	35	62½c qu. Feb. 1
Lehigh P. C. pfd.	1-13-30	105	107	1¾% qu. Jan. 2

Stock	Date	Bid	Asked	Dividend
Louisville Cement[7]	1-10-30	230	....	
Lyman-Richey 1st 6's, 1932[13]	11-18-29	96	99	
Lyman-Richey 1st 6's, 1935[13]	11-18-29	95	98	
Marblehead Lime 6's[14]	1-10-30	95	98	
Material Service Corp.	1-11-30	20		50c qu. Dec. 1
Medusa Portland Cem.[29]	1-13-30	105	115	1.50 Jan. 1
Mich. L. & C. com.[6]	1-11-30	30	....	
Missouri P. C.	1-13-30	33	34	50c qu., 50c ex. Nov. 1
Monolith Midwest[9]	1- 9-30	5	6	
Monolith bonds, 6's[9]	1- 9-30	97½	100	
Monolith P. C. com.[9]	1- 9-30	9	10½	40c s.-a. Jan. 1
Monolith P. C. pfd.[9]	1- 9-30	7½	8	40c s.-a. Jan. 1
Monolith P. C. units[9]	1- 9-30	24½	26½	
National Cem. (Can.) 1st 7's[43]	1-10-30	99¾	....	
National Gypsum A com.	1-14-30	8	9	
National Gypsum pfd.	1-14-30	39	44	
Nazareth Cem. com.[36]	1-10-30	19	21	
Nazareth Cem. pfd.[36]	1-10-30	95	100	
Newaygo P. C. 1st 6½'s[29]	1-13-30	100½	....	
New Eng. Lime 1st 6's[14]	1-10-30	90	95	
N. Y. Trap Rock 1st 6's	1-10-30	94	96	
North Amer. Cem. 1st 6½'s	1-10-30	53	53⅞	
North Amer. Cem. com.[29]	1-13-30	2½	....	
North Amer. Cem. 7% pfd.[29]	1-13-30	17	22	1.75 qu. Aug. 1
North Amer. Cem. units[29]	1-13-30	20	25	
North Shore Mat. 1st 5's[18]	1-14-30	95	....	
Northwestern States P. C.[27]	12-14-29	130	140	$2 Jan. 1
Ohio River Sand com.	1-13-30	....	27½	
Ohio River Sand 7% pfd.	1-13-30	93	102	
Ohio River S. & G. 6's[10]	1-11-30	87	92	
Pac. Coast Agg. 6½'s[23]	11-14-29	99	....	
Pac. Coast Agg. 7's[23]	11-14-29	99	....	
Pacific Coast Cem. 6's[5]	1- 9-30	79	82	
Pacific P. C. com.	1-10-30	20	26	$2 Dec. 18
Pacific P. C. pfd.	1-10-30	75¾	80	1.62½ qu. Jan. 5
Pacific P. C. 6's[5]	1- 9-30	99½	....	
Peerless Cem. (new) com.[21]	1-11-30	10	12	$1 qu. Dec. 20
Peerless Cem. (old) pfd.[21]	1-11-30	80	85	1.75 Dec. 31
Penn-Dixie Cem. pfd.	1-13-30	39	43	1.75 qu. Sept. 15
Penn-Dixie Cem. com.	1-13-30	7	7¼	
Penn-Dixie Cem. 6's	1-15-30	78	80	
Penn. Glass Sand Corp. 6's†	1- 8-30	101	102½	
Penn. Glass Sand pfd.	1- 8-30	100		1.75 qu. Jan. 1
Petoskey P. C.	1-13-30	7½	8¾	15c qu. Dec. 31
Port Stockton Cem. com.	12-14-29	....	4	
Riverside P. C. com.	1-10-30	10	16	
Riverside P. C. pfd.[9]	1- 9-30	75	82	1.50 qu. Nov. 1
Riverside P. C., A[9]	1- 9-30		16	31¼c qu. Nov. 1
Riverside P. C., B[9]	1- 9-30	4		
Santa Cruz P.C. 1st 6's, 1945‡	1-10-30	105¾	....	6% annually
Santa Cruz P. C. com.	1-10-30	92	....	$1 Jan. 1 & $2 ex.
Schumacher Wallboard com.	1-10-30	9½	15	
Schumacher Wallboard pfd.	1-10-30	22	24	50c qu. Nov. 15
Southwestern P. C. units[44]	1-10-30	270	....	
Standard Paving & Mat. (Can.) com.	1-13-30	22½	23	50c qu. Nov. 15
Standard Pav. & Mat. pfd.	1-13-30	85¼	88	1.75 qu. Nov. 15
Superior P. C., A	1-10-30	39¼	40	27½c mo. Feb. 1
Superior P. C., B	1-10-30	12½	14	
Trinity P. C. units[37]	12-14-29	125	135	
Trinity P. C. com.[37]	12-14-29	48	....	
Trinity P. C. pfd.[29]	1-13-30	102	....	
U. S. Gypsum com.	1-13-30	41	42	40c qu. Dec. 31
U. S. Gypsum pfd.[29]	1-13-30	116	126	1¾% qu. Dec. 31
Universal G. & L. com.[8]	1-14-30	25c	75c	
Universal G. & L. pfd.[8]	1-14-30	8	12	
Universal G. & L., V.T.C.[8]	1-14-30	No market		
Universal G. & L. 1st 6's[8]	1-14-30	No market		
Warner Co. com.[16]	1-11-30	36	42	50c qu., 50c ex. Jan. 15
Warner Co. 1st 7% pfd.[16]	1-11-30	98	103	1¾% qu. Jan. 2
Warner Co. 1st 6's[8]	1-14-30	97	100	
Whitehall Cem. Mfg. com.[36]	1-11-30	125	....	
Whitehall Cem. Mfg. pfd.[36]	1-11-30	98	....	
Wisconsin L. & C. 1st 6's[18]	1-14-30	95	....	
Wolverine P. C. com.	1-13-30	5	5½	15c qu. Nov. 15
Yosemite P. C., A com.[9]	1- 9-30	2¾	3¼	

†$52,000 called for redemption at 105, January 1, 1930. ‡Entire issue called for redemption at 110, March 1, 1930.

[1]Quotations by Watling Lerchen & Hayes Co., Detroit, Mich. [2]Quotations by Bristol & Willett, New York. [3]Quotations by Rogers, Tracy Co., Chicago. [4]Quotations by Butler Beadling & Co., Youngstown, Ohio. [5]Quotations by Freeman, Smith & Camp Co., San Francisco, Calif. [6]Quotations by Frederic H. Hatch & Co., New York. [7]By J. J. B. Hilliard & Son, Louisville, Ky. [8]Quotations by Dillon, Read & Co., Chicago, Ill. [9]Quotations by A. E. White Co., San Francisco, Calif. [10]Quotations by Lee Higginson & Co., Boston and Chicago. [11]Nesbit, Thomson & Co., Montreal, Canada. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [13]Peters Trust Co., Omaha, Neb. [14]First Wisconsin Co., Milwaukee, Wis. [15]Central Trust Co., of Illinois, Chicago. [16]T. S. Wilson, Jr., Co., Baltimore, Md. [17]Chas. W. Scranton & Co., New Haven, Conn. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hoit, Rose & Troster, New York. [20]Tucker, Hunter, Dulin & Co., San Francisco, Calif. [21]Baker, Simons & Co., Inc., Detroit, Mich. [22]Hemphill, Noyes & Co., New York City, N. Y. [23]California Co., Los Angeles, Calif. [24]A. B. Leach & Co., Inc., Chicago, Ill. [25]Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [28]Bank of Republic, Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago, Ill. [33]Boettcher Newton & Co., Denver, Colo. [36]Hanson and Hanson, New York. [37]S. F. Holzinger & Co., Milwaukee, Wis. [38]McFetrick & Co., Montreal, Quebec. [39]Tobey and Kirk, New York. [40]Steiner, Rouse and Stroock, New York. [41]Hornblower & Weeks, New York City and Chicago. [43]Jones, Heward & Co., Montreal, Que. [44]Tenney, Williams & Co., Los Angeles, Calif. [46]Stein Bros. & Boyce, Baltimore, Md. [47]Wise, Hobbs & Arnold, Boston. [48]E. W. Hays & Co., Louisville, Ky. [49]Blythe Witter & Co., Chicago, Ill.

INACTIVE ROCK PRODUCTS SECURITIES (Latest Available Quotations)

Stock	Price bid	Price asked
Atlantic Gypsum Products Co. 6's, 1941, $4,000 and 40 shs. com.[1]	35%	....
Atlantic Gypsum Products 6's, 1941, $5,000; 50 shs. com. as bonus[3]	49%	....
Atlantic Gypsum Prod. Co. pfd., 750 sh.[10]	$10 per share	....
Consolidated Cem. com. v.t.c., 3220 shs.[1]	1½ per share	....
Indiana Limestone deb. 7's, 1936, wtih warrants ($1,000)[4]	$500 for the lot	....
Penn.-Dixie Cement Corp. 6's, Sept. 15, 1941 ($1,000)[5]	71%	....
Universal Gypsum com. trust ctfs., 800 shs.[2] (no par)	$5 for the lot	....
Universal Gypsum com., 300 shs.[2] (no par)	$6 for the lot	....

[1]Price at auction by Wise, Hobbs & Arnold, Boston, Dec. 18, 1929. [2]Price at auction by Adrian H. Muller & Son, New York, Dec. 18, 1929. [3]Price at auction by R. L. Day & Co., Boston, Dec. 18, 1929. [4]Price at auction by Adrian H. Muller & Son, Dec. 26, 1929. [5]Price at auction by Wise, Hobbs & Arnold, Dec. 26, 1929. [10]Price at auction by R. L. Day & Co., Boston, Nov. 6, 1929.

Atlas Cement Stockholders Accept Universal Offer

STOCKHOLDERS of the Atlas Portland Cement Co. voted in favor of the proposition to accept the offer of the United States Steel Corp. for its subsidiary, the Universal Portland Cement Co., to take over the assets of the Atlas organization in exchange for 180,000 shares of steel stocks valued at $31,320,000.

In exchange for the stock the Steel Corporation will acquire the 899,211 shares of common stock of the Atlas concern, together with its entire assets and good will. The preferred stock of the company was retired recently and there is no indebtedness.

The number of shares in the voting was overwhelmingly in the majority, an estimate of 94½% of the total number of shares being directly at hand.

The number of shares voting by proxy and in person was 797,113. Proxies received in New York, too late to vote, involved 13,489 shares. Assent by cable with proxies on the water from Europe took care of 23,034 shares. There were no dissenting votes.

According to an official announcement from the U. S. Steel Corp., the business of the Atlas company and the Universal Portland Cement Co. will now be conducted by Universal Atlas Cement Co., subsidiary of the U. S. Steel Corp. The same general policy under which the companies have operated will be continued.

Atlas Portland Cement's Nine Months' Statement

THE ATLAS PORTLAND CEMENT CO., New York City, and alffiliated companies report for the nine months ended September 30 consolidated net income of $2,080,495 after charges and federal taxes, equal after preferred dividends to $2.31 a share on the 899,244 no par common shares outstanding.

The consolidated income account for the nine months ended September 30 follows:

Manufacturing profits, $5,955,256; selling and administrative expense, $2,544,107; operating profit, $3,411,149; non-operating income, $576,491; total income, $3,987,640; depreciation, $788,951; federal taxes, $271,699; sundry other deductions, $583,078; provision for miscellaneous contingencies, $263,417; net income, $2,080,495; preferred dividends, $1,556; common dividends, $1,337,379; surplus, $741,560.

The consolidated balance sheet as of September 30, 1929, showed current assets of $23,165,564, compared with $23,976,290 as of December 31, 1928, and current liabilities of $2,369,228, against $2,113,680, leaving net working capital of $20,796,336 as against $21,862,610.

COMPARATIVE BALANCE SHEET, ATLAS PORTLAND CEMENT CO.

ASSETS

	September 30, 1929	December 31, 1928	December 31, 1927
Fixed assets*	$23,928,790	$22,558,682	$22,778,074
Deferred charges	266,187	224,901	254,253
Patent rights and goodwill	100	100	100
Inventories	3,694,702	4,312,779	5,421,295
U. S. government securities	12,949,705	13,825,217	11,967,371
Sundry other securities	608,412	1,186,419	942,419
Accounts and notes receivable	2,441,390	1,439,940	1,264,224
Cash	3,471,356	3,211,934	2,735,744
Total	$47,360,642	$46,759,973	$45,363,480

LIABILITIES

	September 30, 1929	December 31, 1928	December 31, 1927
Preferred stock	$25,200	$2,500,000	$2,500,000
Common stock	29,978,700	27,503,900	37,503,900
Mortgages payable on real estate	2,000	2,521	2,521
Accounts payable	1,953,588	1,726,447	1,837,234
Federal income tax unpaid	134,187	....	....
Accrued Federal income tax	281,453	387,234	392,756
Sundry contingent reserves	4,540,069	4,194,931	3,883,233
Profit and loss surplus	10,445,444	10,441,941	9,243,836
Total	$47,360,642	$46,759,973	$45,363,480

*Includes real estate, plants, building and equipment less depletion and depreciation reserves.

Wall Street View of Atlas-Universal Combine

SINCE COMMON REPORT has it that the firm of J. P. Morgan and Co., Wall street, New York, bankers, is responsible for the sale of the Atlas Portland Cement Co. to the Universal Portland Cement Co. through an exchange of stock of the United States Steel Corp. for the Atlas stock, the following from *The Wall Street Journal* is of particular interest:

"Acquisition of the Atlas Portland Cement Co. by the Universal Portland Cement Co., subsidiary of the U. S. Steel Corp., should prove a stabilizing influence in the industry on account of the size of the consolidation, although the two companies have widely separated plants and competed in only a few minor districts.

"The Atlas Portland Cement Co. has plants at Coplay, Penn., Northampton, Penn., Hannibal, Mo., Leeds, Ala., Hudson, N. Y., and Waco, Tex. In all these districts the Universal company was without production, and the two companies therefore did not come into competition for business. Plants of the Universal are located at Buffington, Ind., Morgan Park, Minn., and Universal, Penn. The latter is near Pittsburgh, a territory rarely entered by Atlas in its competition for business.

"As the Universal company has an annual capacity of 17,300,000 bbl. a year, and the Atlas company between 19,000,000 and 20,000,000 bbl., the merged concern will have a capacity of around 37,000,000 bbl., a good proportion of the total of the country, making it an important factor in the industry when efforts are being made for stability.

"Action of United States Steel officials in obtaining the Atlas company was merely another step in the plans to keep the big concern in the strongest position. Other plans are under consideration in connection with the organization which will give it additional strength, particularly in its supply of raw materials which are so necessary for the economical operation of its steel plants.

"It is not yet known whether the executive offices of the Universal company will continue in Chicago or be located in New York. However, the impression is that because Chicago is so centrally located the offices will remain in the middle western city.

"Through its acquisition of Atlas the Universal has opened new territory for its sales organization. Because of the location of its own plants the company could not do business in some of the best consuming districts of the country. Freight rates and other factors entered into the situation. With the combined concern it will be able to enter all the leading consuming sections of the East, Middle West and South."

Arundel Earnings for 11 Months

FOR 11 months ended November 30, 1929, the net profit of the Arundel Corp., Baltimore, Md., sand and gravel producer and marine contractor, was $2,228,790 after charges and federal taxes, equivalent to $4.52 a share on 492,556 no-par shares of stock, comparing with $1,709,811 or $3.47 a share in the first 11 months of 1928.

The company has about $30,000,000 of unfilled orders on hand.

Lehigh Cement's Annual Statement

THE FOLLOWING is from the annual report of Col. E. M. Young, president of the Lehigh Portland Cement Co., Allentown, Penn., whose fiscal year ended November 30, 1929:

Net earnings, after provision for depreciation and taxes, were $2,737,476.78, as compared with $4,124,390.87 for the fiscal year ended November 30, 1928. Four quarterly dividends on the preferred stock (including the disbursement paid January 2, 1930) and four quarterly dividends on the common stock (including the disbursement to be paid February 1, 1930) have been deducted from 1929 earnings, leaving $100,253.59 to be carried forward to surplus.

After deduction of preferred dividends paid there were available on issued common stock $1,249,030.03, or $2.77 per share, as compared with $2,611,102.87, or $5.79 per share, on November 30, 1928.

There were acquired during the year 5776 shares of preferred stock. The number of preferred shares thus far acquired for retirement and cancellation totals 13,983. The total number of preferred shares required to be retired as of November 30, 1929, under the provisions of issue, was 7319 shares. The company, therefore, has set up a credit

equivalent to two years' sinking fund requirements.

The liquid position of the company is reflected by the item of U. S. Treasury certificates and Liberty loan bonds $1,258,500, demand loans $8,000,000 and cash $3,929,544.84, making a total of $13,188,044.84.

Provision for depreciation has been made by setting aside $1,957,577.51 for the year, making a total of $18,724,684.71 to date.

Four quarterly dividends on the 7% class "A" stock of the Great Lakes Portland Cement Co. held by this company, aggregating $151,958.26, were received and credited to income.

The earnings of the company for the fiscal year 1929 were considerably lower than for the fiscal year 1928. This reduction in earnings was due in part to a decrease in the consumption of cement this year as against last, in part to the pressure of foreign competition along the seaboard and in part to severe reductions in the price of cement.

According to the reports of the Bureau of Mines, the total consumption of cement in the United States for the fiscal year ended November 30, 1929, was approximately 3,500,000 bbl. less than for the corresponding 1928 period. Although this reduction is small, compared with the total number of barrels consumed, nevertheless the downward trend in shipment was sufficient to bring about drastic price reductions in almost the entire territory served by the company.

The cement industry has again struggled through the year without any tariff protection against foreign competition. A duty of 8 cents per 100 lb., or less than 32 cents per bbl., was reported by the ways and means committee. This rate was incorporated in the Hawley bill as finally passed by the house. The senate finance committee also reported a duty of 8 cents per 100 lb., and it is hoped that the senate as a whole will vote favorably on this recommendation. This rate, if approved, however, will afford only partial protection to the American cement manufacturer.

The installation of such equipment as was necessary to double the capacity of our newly built mill at Sandt's Eddy has been completed and this plant will shortly be put on a production basis of 2,000,000 bbl. per year. Other minor improvements in equipment and machinery have been made at a number of plants, increasing cement quality and effecting operation economies.

Federal, state and municipal governments, railroads and hydro-electric companies will require large quantities of cement in 1930. Whatever slackening there may be in small building operations will be more than offset by the requirements for large projects. Consumption of cement in 1930 should, therefore, be approximately the same as in 1929.

The company is in a strong position and satisfactory results from an earning standpoint are looked forward to next year.

COMPARATIVE INCOME ACCOUNT
LEHIGH PORTLAND CEMENT CO.
(For the Years Ended November 30, 1928, and November 30, 1929)

	1929	1928
Sales: Less discounts, allowances, etc.	$19,346,790.86	$23,522,906.37
Cost of sales:		
Manufacturing and shipping cost	$11,168,759.26	$13,108,686.92
Provision for depreciation, obsolescence and accrued renewals	2,292,204.78	2,271,847.55
Total cost of sales	$13,460,964.04	$15,380,534.47
Manufacturing profit	$5,885,826.82	$8,142,371.90
Selling, administrative and general expense	3,569,781.55	3,866,982.14
Net profit from operations	$2,316,045.27	$4,275,389.76
Miscellaneous income	736,590.36	405,318.93
Total income	$3,052,635.63	$4,680,708.69
Provision for federal income taxes	315,158.85	556,317.82
Net income for the year carried to surplus account	$2,737,476.78	$4,124,390.87

SURPLUS ACCOUNT—November 30, 1929

Balance at November 30, 1928		$8,324,131.30
Add:		
Net income for the year ending November 30, 1929		2,737,476.78
Adjustment of unrealized appreciation for stone removed		19,022.32
		$11,080,630.40
Deduct:		
Cash dividends:		
On preferred stock	$1,485,491.00	
On common stock	1,124,066.24	
Premium paid on 5776 shares of 7% cumulative preferred stock retired	46,688.27	
		2,656,245.51
Surplus—carried to balance sheet		$8,424,384.89

COMPARATIVE BALANCE SHEET
ASSETS

	November 30, 1929	November 30, 1928
Property account:		
Land, buildings, machinery and equipment at cost	$48,501,299.62	$47,093,428.19
Less—Reserve for depreciation	18,724,684.71	16,767,107.20
	$29,776,614.91	$30,326,320.99
Mineral deposits, less depletion	1,682,583.18	1,729,808.17
Total	$31,459,198.09	$32,056,129.16
Investments and advances:		
Investments in and advances to affiliated companies and subsidiaries not consolidated	$2,986,927.41	$3,114,481.22
Workmen's compensation insurance fund invested in U. S. government obligations	325,343.00	314,729.82
Treasury stock—common at par	65,950.00	30,750.00
Miscellaneous stocks and bonds, at cost	84,429.44	107,520.44
Total	$3.462,649.85	$3,567,481.48
Current assets:		
Cash	$3,929,544.84	$5,057,284.97
Demand loans	8,000,000.00	2,500,000.00
Liberty Loan bonds and U. S. Treasury certificates at cost	1,258,500.00	5,158,500.00
Working funds and advances	203,569.84	166,190.64
Accounts and bills receivable, less reserve for discounts and doubtful accounts	1,277,325.10	1,745,376.56
Inventories at cost or market, whichever is lower	4,204,283.72	4,645,452.45
Total	$18,873,223.50	$19,272,804.62
Deferred charges:		
Unabsorbed stripping charges, etc.	$1,296,082.96	$1,041,282.25
Prepaid insurance	30,918.38	56,637.53
Total	$1,327,001.34	$1,097,919.78
Total	$55,122,072.78	$55,994,335.04

COMPARATIVE BALANCE SHEET
LIABILITIES

	November 30, 1929	November 30, 1928
Capital stock:		
Preferred 7% cumulative:		
Authorized—300,000 shares of $100 each Issued—225,174 shares	$22,517,400.00	$22,517,400.00
Less — Retired and purchased for retirement	1,398,300.00	820,700.00
Total	$21,119,100.00	$21,696,700.00
Common:		
Authorized—600,000 shares of $50 each Issued—450,348 shares	$22,517,400.00	$22,517,400.00
Current liabilities:		
Accounts payable	$642,678.24	$775,059.24
Accrued wages, salaries and general taxes	302,140.06	316,952.43
Reserve for federal income taxes	315,158.85	556,317.82
Dividends payable	650,129.25	662,137.50
Total	$1,910,106.40	$2,310,466.99
Reserves:		
Returnable cotton duck bags	$152,555.91	$226,812.54
Compensation and fire insurance reserves	588,387.32	489,663.63
Total	$740,943.23	$716,476.17
Unrealized appreciation arising from appraisal of mineral deposits as of March 1, 1913	$410,138.26	$429,160.58
Surplus	$8,424,384.89	$8,324,131.30
Total	$55,122,072.78	$55,994,335.04

Northwestern States Cement's Balance Sheet

THE NORTHWESTERN STATES PORTLAND CEMENT CO., Mason City, Iowa, reports its financial condition at the end of its fiscal year, November 30, 1929, as follows:

ASSETS

Plant and equipment (Mason City)	$6,544,199.49
Plant and equipment (Gilmore City)	565,711.67
Cement stock and material in process	417,552,07
Inventories	411,770.94
Current assets	764,195.19
Investments and funds at interest	437,425.43
	$9,140,854.79

LIABILITIES

Capital stock	$5,250,000.00
Surplus	35,265.31
Current liabilities	217,769.67
Reserves: Depreciation, depletion, etc.	3,637,819.81
	$9,140,854.79

The present officers of the company are as follows: Hanford MacNider, president; B. A. MacDonald, assistant to the president; A. F. Frudden, vice-president; W. G. C. Bagley, treasurer; Peter Anderson, secretary; C. A. Hanson, assistant secretary.

Canada Cement's Annual Report

THE FOLLOWING is from the annual report of A. C. Tagge, president of the Canada Cement Co., Ltd., Montreal, Que., whose fiscal year ended November 30, 1929:

The Canada Cement Co. has shared in the continued activity in the building trades and sales of cement have been larger in practically all districts. This has enabled it to operate its plants more continuously and has resulted in some operating economies. The improvement in this respect has been greatest in the West and has enabled making a reduction in price throughout that district, this being in accord with the company's es-

tablished policy of encouraging the use of the product by reducing the price whenever circumstances permit. Prices in other districts have remained at practically the same level as last year.

CANADA CEMENT COMPANY LIMITED
(Balance Sheet, November 30, 1929)

ASSETS		
Current Assets:		
Inventories		$1,892,793.50
Accounts receivable (less bad debt reserve):		
Customers accounts and bills receivable	$917,969.12	
Other accounts	135,057.06	1,053,026.18
Deposits on tenders		42,723.25
Deposits under Workmen's Compensation Commission		74,937.50
Government bonds and other securities		198,704.00
Call loan with trust company		1,000,000.00
Cash		1,233,885.76
		$5,496,070.19
Deferred Charges to Operations:		112,659.68
Investments:		
In the St. Lawrence Land Co. (owning the Canada Cement Building and other properties), and other investments		7,047,015.99
Cost of Properties:		
Land, buildings, plant, equipment, etc., less depreciation		38,988,475.93
		$51,644,221.79
LIABILITIES		
Current Liabilities:		
Accounts payable		$1,130,515.36
Bond interest accrued and unpresented coupons		120,586.66
Preference dividend No. 8 payable December 31, 1929		341,209.19
		$1,592,311.21
Reserves:		
Fire insurance		$307,469.30
Extraordinary repairs and renewals		50,000.00
Cloth sacks outstanding		150,000.00
Industrial accidents		44,500.00
Contingent reserve (a portion of which is available for government income taxes)		313,845.95
Preference stock sinking fund		16,485.47
		$882,300.72
First Mortgage Sinking Fund Gold Bonds 5½% Series "A" Due 1947:		
Authorized		$30,000,000.00
Issued		$20,000,000.00
Purchase Money Obligations:		
Payable $300,000.00 per year for five years		1,500,000.00
Peference Stock 6½% Sinking Fund Cumulative:		
Authorized (of which $21,000,000.00 has been issued)		$25,000.000.00
Outstanding		$20,998,000.00
Preference Stock Redemption Account:		
20 shares redeemed and cancelled		2,000.00
Common Stock and Surplus:		$6,403,904.75
Profit and Loss Account:		
Profit from operations for the year ending November 30, 1929, after making provision of $2,038,717.47 for depreciation of capital assets	$3,171,115.69	
Deduct:		
Bond interest	$1,100,000.00	
Fire insurance reserve	154,519.49	
Reserve for extraordinary repairs and renewals	25,000.00	
Reserve for industrial accidents	24,500.00	
Contingent reserve (for government income taxes, etc.)	250,000.00	
Preference stock sinking fund	16,394.70	
	$1,570,414.19	
	$1,600,701.50	
Deduct:		
Dividend on preference stock	1,364,870.00	
	$235,831.50	
Balance of profits November 30, 1928	29,873.61	265,705.11
A total of		$6,669,609.86
represented by 600,000 shares of no par value common stock out of an authorized issue of 750,000 shares		
		$51.644.221.79

The export business is still handicapped by the lower labor costs and the lower ocean freight rates of European competitors, and is about the same as for several years past.

The reconstruction of the Hull, Que., plant was completed and the plant put into operation in June of this year. It is showing very satisfactory results.

In order to provide better service and more economical distribution of the product along the eastern seaboard, storage and shipping plants are being established at several important points. For this purpose suitable properties have been acquired at St. John, Halifax and Quebec. The storage bins and packing plants have been completed at Halifax and Quebec and similar equipment will be built at St. John during this year (1930). In order to supply these distributing points with cement and to bring back from Nova Scotia the gypsum used at the eastern plants, the company has constructed a self-discharging vessel of 3500 tons carrying capacity specially designed for handling and unloading these materials in bulk. This boat was put into operation in September.

During the year a large number of employes availed themselves of the opportunity to become shareholders or to increase their holdings of company stock by purchasing under the employes' stock distribution plan. The officers are convinced that the very low labor turnover and the marked loyalty of employes to the interests of the company are due in large measure to the fact that more than half of the employes are shareholders.

Accident prevention is recognized as an important part of the operating work and is being vigorously carried on at all of the plants. The company again had the honor of having one of its plants, namely, Plant No. 12 at Exshaw, Alta., win the Portland Cement Association safety trophy. This is the fifth Canada Cement plant that has received this honor.

Income Compared with 1928

The Canada Cement Co., Ltd., reports for the year ended November 30 net income of $1,600,701 after charges, reserves and sinking fund requirements, equal after preferred dividends to 39c. a share on the 600,000 shares of no par common stock outstanding. This compares with $1,396,951 before sinking fund requirement in the preceding fiscal year, or 5c. a share on the same common basis. The income account compares:

	1929	1928
Operating income	*$3,171,115	$4,673,774
Depreciation	....	1,598,873
Bond interest	1,100,000	1,100,000
Fire insurance reserve	154,519	152,950
Repairs and renewals reserve	25,000	25,000
Contingent reserve	250,000	230,000
Accident reserve	24,500	20,000
Reserve for sacks outstanding	....	150,000
Preferred stock sinking fund	16,395	....
Net income	$1,600,701	$1,396,951
Preferred dividends	1,364,870	1,365,000
Preferred stock sinking fund	....	2,077
Surplus	$235,831	$29,874

*After provision for depreciation.

Santa Cruz Cement Pays Extra Dividend

THE directors have declared the regular quarterly dividend of $1 per share, payable January 1, and an extra dividend of $2 per share, payable December 24, 1929, both to holders of record December 19. A year ago an extra dividend of $2 was declared, as compared with an extra of $1 per share two years ago.

Warner Company Bonds Listed on New York Stock Exchange

THE New York Stock Exchange has authorized the listing of $6,869,000 first mortgage 6% sinking fund bonds, due April 1, 1944.

Wabash Portland Balance Sheet

THE FOLLOWING is the balance sheet of the Wabash Portland Cement Co., Detroit, Mich., as of November 30, 1929:

Assets:	1929	1928
Property (less depreciation and depletion)	$2,012,306	$2,069,096
Cash, Govt. bonds, etc.	1,068,986	695,656
Accounts receivable, etc.	329,109	337,823
Total	$3,410,401	$3,102,575
Liabilities:		
Capital stock	$ 914,650	$ 914,650
Accounts payable	80,399	57,847
Tax reserves	40,627	38,501
Surplus	2,374,725	2,091,577
Total	$3,410,401	$3,102,575

Called for Redemption

THE entire issue ($416,500) of Associated Gravel first 6½'s of 1936 has been called for redemption at 102 on February 1, 1930, at Wells Fargo Bank and Union Trust Co., San Francisco.

Recent Dividends Announced

Alpha P. C. com. (qu.)	75c	Jan 15
American Brick pfd. (qu.)	50c	Feb. 1
Arundel Corp. com. (qu.)	75c	Jan. 1
Boston Sand and Gravel pfd. (qu.)	87½c	Jan. 1
Calaveras Cement pfd. (qu.)	$1.75	Jan. 15
Cleveland Builders Supply (qu.)	50c	Apr. 1
Construction Mat. pfd. (qu.)	87½c	Feb. 1
Dolese and Shepard (qu.)	$2.00	Jan. 2
Dolese and Shepard extra	$1.00	Jan. 2
Lawrence P. C. com. (qu.)	$1.00	Dec. 28
Lehigh P. C. com (qu.)	62½c	Feb. 1
Marbelite Corp. pfd. (qu.)	50c	Jan. 10
Medusa P. C. com. (qu.)	$1.50	Jan. 1
Medusa P. C. pfd. (qu.)	$1.50	Jan. 1
Monolith P. C. com. (qu.)	40c	Jan. 1
Monolith P. C. pfd. (qu.)	40c	Jan. 1
New York Trap Rock $7 pfd. (qu.)	$1.75	Jan. 2
Northwestern States P. C.	$2.00	Jan. 1
Pacific P. C. pfd. (qu.)	$1.62½	Jan. 5
Penn Glass Sand pfd. (qu.)	$1.75	Jan. 1
Petoskey P. C. (qu.)	15c	Dec. 31
Santa Cruz P. C. (qu.)	$1.00	Jan. 1
Santa Cruz P. C. (ext.)	$2.00	Dec. 24
Superior P. C. class A (mo.)	27½c	Feb. 1

National Crushed Stone Association Has Attractive Program for 1930 Convention

THE PROGRAM for the 1930 convention of the National Crushed Stone Association to be held in Cincinnati, January 20 to 23 inclusive, indicates that the usual high standards will be maintained. The convention sessions will be limited to three full days, the last day, January 23, being set aside so that all may attend the trade practice conference of the crushed stone industry to be called by the Federal Trade Commission. The following is the announced tentative program of the convention:

TENTATIVE PROGRAM, CINCINNATI CONVENTION, JANUARY 20, 21, 22 AND 23, 1930

MONDAY, JANUARY 20
Morning Session

W. F. Wise, president, presiding

10:00—Address of welcome—Hon. Russell Wilson, mayor of Cincinnati, Ohio.
10:15—Response for the association—E. E. Evans, Whitehouse Stone Co., Toledo, Ohio.
10:25—Report of the president—W. F. Wise.
10:40—Reports of directors on business conditions in 1929 and outlook for 1930.
12:00—Appointment of convention committees:
- Resolutions
- Nominating
- Finance
- Auditing
- Reception
- Publicity
- Constitution and by-laws

12:30—Report on incorporation of association—Otho M. Graves.
12:45—Adjournment.
1:00 to 2:00 P. M.—Greeting luncheon—Everyone, including active and associate members, as well as guests, is cordially invited to attend.
Luncheon address—Hon. Myers Y. Cooper, governor, state of Ohio.

MONDAY, JANUARY 20
Afternoon Session

A. L. Worthen, member executive committee, presiding

2:30—Report of membership committee—J. R. Boyd, chairman.
2:40—"To What Extent Does a Highway Bond Protect the Materials Producer?"—M. O. Garner, general counsel, National Surety Co., New York City.
3:10—Discussion—Led by Harold Williams, member of the Boston bar, Boston, Mass.
3:20—"Co-operation Between Producers and Construction Engineers"—Paul M. Tebbs, assistant chief engineer, Pennsylvania Department of Highways, Harrisburg, Penn.
3:40—Discussion.
3:50—"Simplification in Industry"—R. L. Lockwood, Division of Simplified Practice, U. S. Bureau of Standards, Washington, D. C.
4:10—Report of committee on standards—F. S. Jones, chairman.
Sub-committee for the standardization of commercial sizes of crushed stone—A. T. Goldbeck, chairman.
Sub-committee for the standardization of drilling equipment—A. L. Worthen, chairman.
Sub-committee for the standardization of plant equipment—F. W. Schmidt, chairman.
Sub-committee for the standardization of specifications and the marking of supplies and equipment—John Rice, Jr., chairman.
Sub-committee for the standardization of quarry equipment—A. G. Seitz, chairman.
4:40—Discussion.
5:00—Adjournment.

MONDAY EVENING

7:30—Formal opening of Manufacturers' Division exposition of quarry equipment, machinery and supplies—Exposition room.
9:30—Smoker and entertainment.

TUESDAY, JANUARY 21
Morning Session

H. E. Bair, member, executive committee, presiding

10:00—"Transportation, Past and Present"—M. J. Gormley, executive vice-president and chairman, Car Service Division, American Railway Association, Washington, D. C.
10:20—Report of committee on research—John W. Stull, chairman.
10:30—"Some Researches and Their Practical Application"—A. T. Goldbeck, director, bureau of engineering, National Crushed Stone Association.
10:50—Discussion.
11:00—"Pre-mixed Concrete"—Illustrated by motion pictures—Arthur C. Avril, Avril Tru-Batch Concrete, Inc., Cincinnati, Ohio.
11:30—Report of auditing committee.
11:40—Report of committee on finance.
11:50—Discussion.
12:15—Further report on incorporation of association—Otho M. Graves.
12:25—General business.
12:30—Adjournment.

TUESDAY AFTERNOON
Luncheons and Group Meetings

Operating Men, Superintendents and Manufacturers
A. G. Seitz, General Crushed Stone Co., presiding

1:15—Luncheon.
2:00—"In What Respects Should the Quality of Crushed Stone be Improved?"—A. S. Rea, chief engineer, bureau of tests, Ohio Department of Highways, Columbus, Ohio.
2:20—Discussion.
2:40—"Report of Committee on the Mechanical Elimination of Dust"—F. O. Earnshaw, chairman.
2:50—Discussion.
3:00—Vibrating screens—C. G. Adams, France Stone Co., Toledo, Ohio.
3:15—Revolving screens—W. R. Sanborn, Lehigh Stone Co., Kankakee, Ill.
3:30—Discussion.
3:45—Question box.
4:00—Adjournment.

Sales Problems

Wm. E. Hilliard, New Haven Trap Rock Co., New Haven, Conn., presiding

1:15—Luncheon.
1:45—"Concrete Residence Floors"—R. E. Copeland, Portland Cement Association, Chicago, Ill.
2:15—Discussion.
2:30—"The Importance of Proper Specifications for Crushed Stone"—L. C. Bonnell, F. R. Upton, Inc., Newark, N. J.
2:45—Discussion—Led by A. B. Rodes, Franklin Limestone Co., Nashville, Tenn.
3:00—"Stone Sand, Its Successful Use and Characteristics"—M. L. Jacobs, Bethlehem Mines Corp., Bethlehem, Penn.
3:15—Discussion—Led by Dr. H. F. Kriege, France Stone Co. laboratory, Toledo, Ohio.
3:30—Report of committee on ballast—E. J. Krause, chairman.
3:45—"Group Advertising to Promote Sales"—Col. E. J. McMahon, executive secretary, St. Louis Quarrymen's Association.
4:00—"Individual Advertising"—D. W. Saffel, sales manager, Greer Limestone Co., Morgantown, W. Va.
4:15—Discussion—Led by C. A. Munson, New Haven Trap Rock Co., New Haven, Conn.
4:30—Adjournment.

Annual Meeting of the National Agstone Association

N. G. Farber, president, presiding

1:00—Luncheon.
2:00—Address by President N. G. Farber.
2:30—"Shakespeare, the Master Salesman"—W. B. Burruss, internationally known business counsellor.
3:00—Informal discussion.
3:15—Committee reports.
3:45—Report of officers.
4:15—Election of directors.
4:30—Election of officers.
4:45—Address of president-elect.
5:00—Adjournment.

WEDNESDAY, JANUARY 22
Morning Session

W. F. Wise, president, presiding

10:00—"A Summary of the Various Types of Sewage Treatment Works with Overall Costs and Comments on Their Application"—Samuel A. Greeley of Pearse, Greeley and Hansen, hydraulic sanitary engineers, Chicago, Ill.
10:20—Discussion.
10:30—"Tests of Pavement Concrete Being Conducted by the Bureau of Public Roads"—F. H. Jackson, senior testing engineer, U. S. Bureau of Public Roads, Washington, D. C.
10:50—Discussion.
11:00—"Airport Paving"—R. H. Simpson, chief engineer, department of public service, Columbus, Ohio.
11:15—Discussion.
11:25—"The Development of County Roads"—Charles M. Upham, engineer-director, American Road Builders Association, Washington, D. C.
11:45—Report of committee on resolutions.
11:55—Report of committee on constitution and by-laws.
12:10—Report of nominating committee and election of officers.
12:30—Greeting of president-elect.
12:45—Adjournment.

Luncheon

1:00 to 2:00 P. M.—Buffet luncheon will be served in the exposition hall for those wishing to avail themselves of the opportunity for conference with manufacturers of machinery, equipment and supplies.

WEDNESDAY, JANUARY 22
Afternoon Session

C. M. Doolittle, Canadian regional vice-president, presiding

2:00—Report of committee on trade practice—Otho M. Graves, chairman.
2:30—Discussion.
3:30—Report of accident prevention committee—H. E. Rodes, chairman.
3:40—Discussion.
4:00—Address—L. R. Cartwright, vice-president, Mid-West Rock Products Co., Indianapolis, Ind.
4:20—"A Service for Employers in the Crushed Stone Industry"—I. V. Scott, National Safety Council, Chicago, Ill.
4:30—General business.
4:45—Adjournment.

WEDNESDAY EVENING
Annual Banquet

Roof Garden, Hotel Gibson, 7:30 P. M.

Toastmaster—Russell Rarey, The Marble Cliff Quarries Co., Columbus, Ohio.
Speakers:
Presentation of National Crushed Stone Association safety trophy—By a representative of the United States Bureau of Mines.
"The Future of Business"—Hon. George E. MacIlwain, business economist, lecturer, author and analyst.
"Co-operation"—Capt. Irving O'Hay, philosopher and humorist.

THURSDAY, JANUARY 23

10:00—Trade practice conference for the entire crushed stone industry, called by the Federal Trade Commission and presided over by its chairman, E. A. McCulloch.
8:00 P. M.—Meeting of the board of directors.

Ladies' Entertainment Program

Mrs. A. Acton Hall, Ohio Marble Co., Piqua, Ohio, in charge of arrangements.

MONDAY, JANUARY 20

10:00—Registration.
3:30—Reception and tea in ladies' headquarters.
8:15—Card party at the Hotel Gibson.

TUESDAY, JANUARY 21

10:15—Ladies assemble at headquarters.
10:30—Sightseeing trip, including visit to famous Rookwood pottery and many other interesting points, stopping at
12:30—Alms hotel for lunch. Following luncheon, continue on sightseeing trip.
4:00—Return to hotel.

WEDNESDAY, JANUARY 22

10:15—Tour of Cincinnati's exclusive shops, including Loring Andrews, Lawtons, Giddings.
12:00—Ladies assemble at headquarters.
12:15—Luncheon—Chatterbox, Hotel Sinton.
2:00—Visit art collection at the home of Mr. and Mrs. Charles P. Taft, located three blocks from the hotel.
7:30—Annual banquet.

THURSDAY, JANUARY 23

12:15—Ladies assemble at headquarters.
12:30—Luncheon—Florentine dining room, Hotel Gibson.

Where Accidents Hurt!

COMPENSATION award of $16 per week for 132 weeks was allowed recently by the West Virginia state compensation department to George W. Coulter of Thayer, who received a serious injury in the course of his employment for the Sun Sand Co. of Thayer.—*Charleston (W. Va.) Gazette.*

Twenty-Six Cement Mills Win Annual Safety Trophy

Portland Cement Association Members Close Epoch-Making 1929 Contest

SO FAR as is known the cement mills within the membership of the Portland Cement Association achieved a record for industrial safety which is unequaled in America, and perhaps in the world, when it was announced soon after January 1 that 26 mills of some 150 operating plants in the association membership had won the association safety trophy by avoiding lost-time accidents during 1929.

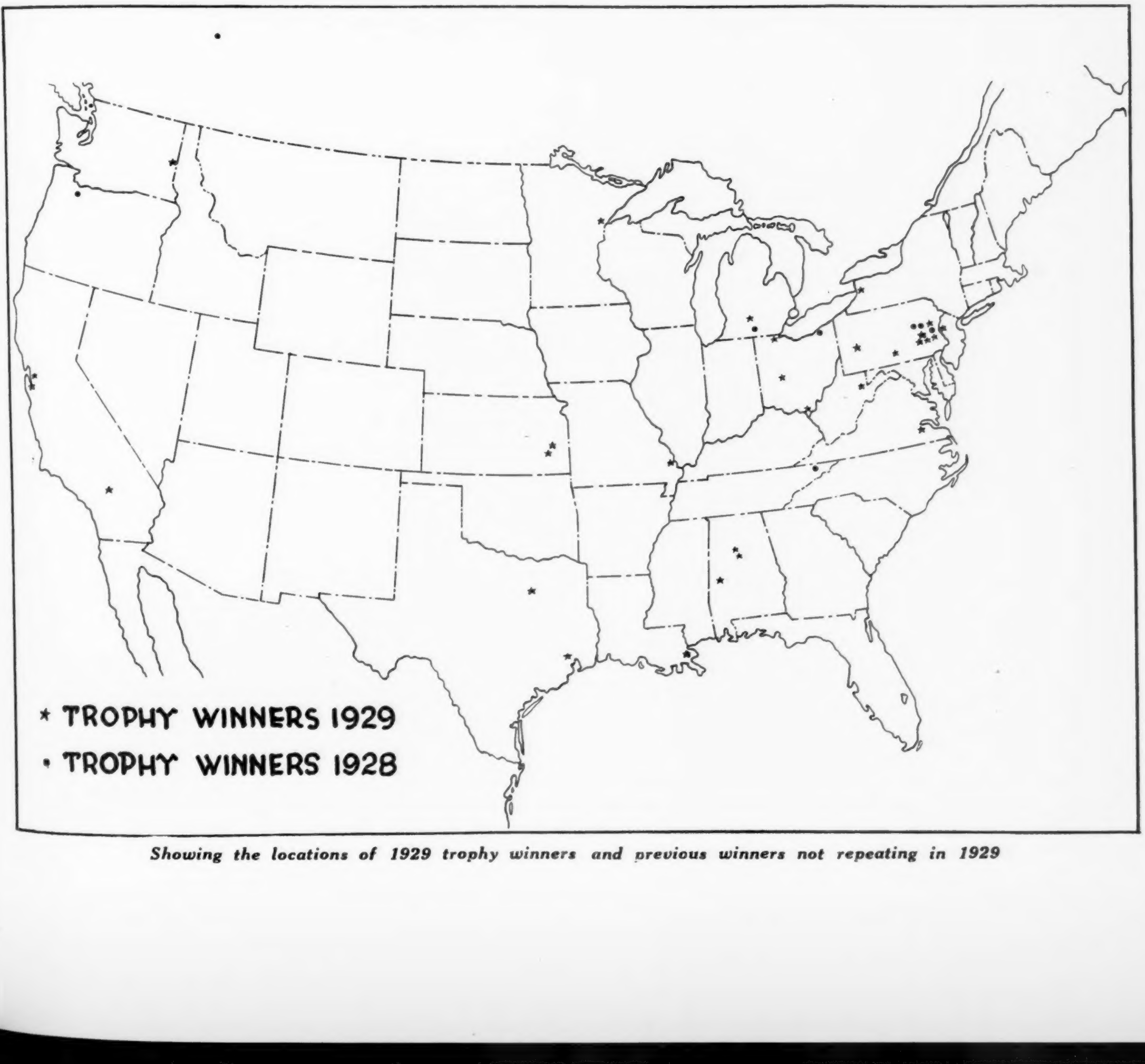
Perfect Records for 26 Mills

One additional mill had no accidents during the year, but could not quality to win the trophy because it was in operation less than six months required. Another had an entirely clear record except for a slight accident now awaiting a compensation hearing before a state commission. A favorable ruling would entitle it also to the trophy. All told, nearly one-sixth of the operating plants within association membership in the United States, Canada, Mexico, Cuba, Argentine and Uruguay avoided personal injuries to employes involving loss of time, permanent disability or death during the entire year, an unheard of and an almost unbelievable accomplishment. Twenty-three additional mills had but one accident each.

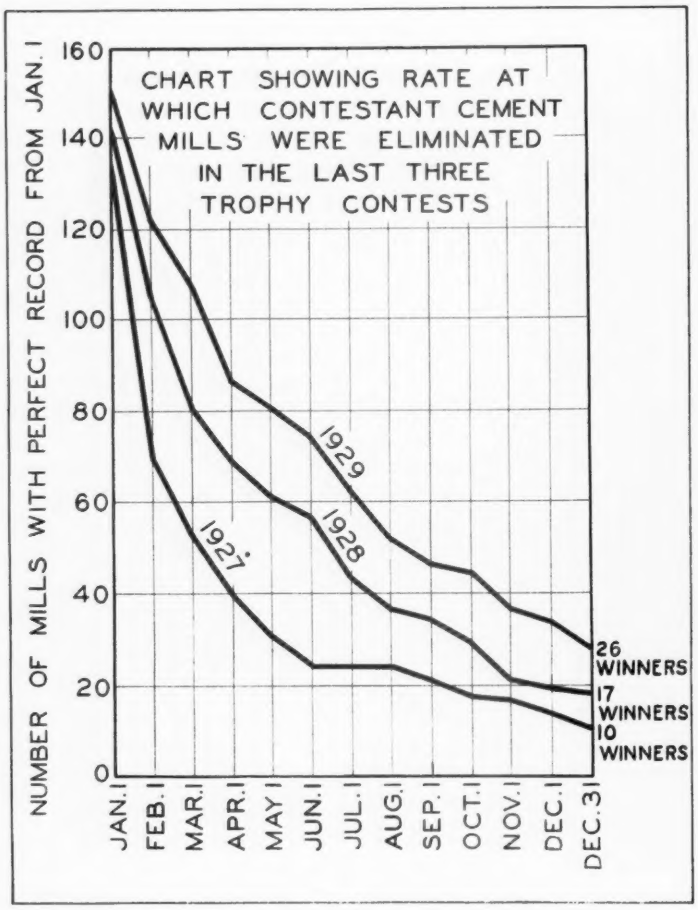
The winners of the Portland Cement Association safety trophy contest for 1929 are 53% more numerous than the winners in 1928, and the 1929 awards will equal in number 43% of all the awards during the seven years of the contest, starting in 1923 and including 1929. The years 1923 and 1924 had one award each; 1925 and 1926 had two awards each; 1927 had 10 awards and 1928, 17 awards. Twenty-seven mills won the trophy one or more times prior to 1929. During the year just closed, three mills completed three-year safe records and six mills completed two-year records. No mill has ever previously completed more than two calendar years without accident. Sixteen mills won the trophy for the first time and one won it for the third time on a one-year record.

Winning Mills Widely Scattered

Of the 25 mills located in the Lehigh Valley, four won trophies. Six mills in the South (three in Alabama, two in Texas and one in Louisiana) ably represented that sec-



Showing the locations of 1929 trophy winners and previous winners not repeating in 1929



Showing the rate at which contestant cement mills were eliminated in contests of 1927, 1928 and 1929

tion as winners. The Chesapeake region proudly presents two winners out of the total of five mills located in that section. In the Midwest, representing the country west of Syracuse, north of the Ohio and east of the Mississippi, are located six winners, the territory from the Mississippi to the Rockies (north of Texas) had three winners and the Pacific Coast states four winners. For the first time since 1925 Canada had no winners.

The winners represent almost every important cement producing section as well as a wide range of operating conditions, process, raw material, equipment and nationality of employes. The results demonstrate even more forcefully than those of the past contests that perfect records are possible of attainment not only on rare occasions but with frequency and almost regularity. They also indicate beyond doubt that present methods employed in the cement industry for the reduction of accidents are effective in nature and are being intelligently employed.

Cowell, Iola, Ironton Lead Again

An outstanding feature of the 1929 contest was the continued leadership of the three plants which, having won perfect records in 1927, repeated in 1928, giving the industry its first two-year accident-free operating records. These same three mills are winners in 1929 and by reason of their seniority top the list. They are the Cowell, Calif., plant of the Cowell Portland Cement Co., the Iola, Kan., plants of the Lehigh Portland Cement Co. and the Ironton, Ohio, plant of the Alpha Portland Cement Co.

For many years Cowell plant has made accident prevention one of the chief features of its operating program. Its last lost-time accident occurred on May 12, 1926, giving it 1330 days (up to January 1, 1930) with a clear record. Its achievement of 43½ months without recordable accidents keeps the Cowell plant well in the lead with the industry's greatest no-accident record. There are departments at Cowell with an accident-free record of about 10 years.

W. H. George, secretary and general manager of the Cowell Portland Cement Co., who is a member of the committee on accident prevention and insurance of the Portland Cement Association and has made safety work a personal hobby for many years, was elated with the showing made by the Cowell organization. "Every man who had a part in making this remarkable record should feel a degree of personal satisfaction and pride unattainable in any other way," said he. Superintendent E. D. Barnett, who is a graduate mining engineer and known both as an accomplished engineer and a skillful operator, has made accident prevention a feature since he took his present position in 1923. W. J. Dermody, captain of the first-aid team and machine shop foreman, is known throughout California and far beyond as an original and very active safety teacher and preacher for 20 years. With the finest personnel line-up in its history the mill organization has gone actively to work, subjected almost all other considerations, in an effort to stretch the present three and one-half year record into a five-year record. The entire industry will watch this effort.

Charles A. Swiggett, superintendent of Iola, Kan., plant, Lehigh Portland Cement Co.

E. D. Barnett, superintendent of Cowell, Calif., plant, Cowell Portland Cement Co.

Second Place to Iola, Third to Ironton

The Iola, Kan., plant of the Lehigh Portland Cement Co. retained the position of second longest safety record in the industry which it acquired a year ago. The Iola mill suffered its last accident on September 10, 1926, and therefore had 1209 accident-free days, or over 39½ accident-free months, to its credit on January 1, 1930. To those who have felt that old plants are handicapped in this contest as compared with new plants, it will be remembered that Iola, the second plant erected west of the Mississippi, was the second in that region to win the associa-

tion trophy and now has won it three times. (The first plant west of the Mississippi, that of the San Antonio Portland Cement Co., was the first plant in the country to be awarded the trophy, which it has won twice.)

A year ago Superintendent C. A. Swiggett of Iola promised the Lehigh operating officials that his mill would make the three-year

Frank C. Brownstead, superintendent of Ironton, Ohio, plant, Alpha Portland Cement Co.

record and now that he has made good congratulations have been reaching him from the Lehigh mills and from the officials of other companies. "Well done," wrote one of the Lehigh officers. "Now we are counting on you to keep Lehigh in the lead by making it five years." Mr. Swiggett is a man of determination and is expected to perform accordingly.

Alpha's entry in the race for a three-year record was equally victorious. Its Ironton, Ohio, plant, including a 600-ft. limestone mine, completed 1119 days without accident on January 1, 1930. Since its last lost-time accident on December 8, 1926, the Ironton plant has mined the raw material, and manufactured and shipped several million barrels of cement without the necessity of even transferring a man because of accident. To attain a record like Ironton's has become the goal of all of the Alpha plants. Superintendent F. C. Brownstead, who has been in charge at Ironton since 1909, is elated at the opportunity to celebrate his 20th year as superintendent with another perfect record. During 1929 the Ironton plant was recognized in an unusual manner by having its chief engineer, W. W. Hamilton, selected to head the safety work of the Alpha company with headquarters at Easton.

Two-Year Records Outstanding

In contrast with the three mills which at the end of 1928 had completed three consecutive calendar years of accident-free operation, six mills have completed two consecutive years ending December 31, 1929. Of this group the Mildred, Kan., mill of the Consolidated Cement Corp. takes seniority with 1020 days since its last lost-time accident. This plant has had but one minor accident since 1926, the latter occurring on March 19, 1927. Improvement at Mildred has been almost phenomenal. Five years ago, in 1925, it suffered 57 lost-time accidents, with a loss of 564 days. In 1926 it showed a record of 29 accidents, with a loss of 475 days. President John Senior and General

George A. Lawniczak, superintendent of Bellevue, Mich., plant, Alpha Portland Cement Co.

Superintendent James E. Curtis took up safety work at Mildred as a major problem and in 1927 the single accident cost but five days' time. There has been no loss since. District Superintendent R. M. Johnson is located at Mildred and is in direct charge of the mill.

Alpha scores again near the head of the list with a record of 990 accident-free days at its Bellevue, Mich., plant. As a result, Superintendent George A. Lawniczak is wearing a broad smile and members of the mill safety organizations are already planning on a recurrence of the big safety party which occurred at Bellevue when their trophy was dedicated in July, 1929. Bellevue, like Mildred, had but one lost-time accident in 1927, that occurring on July 24, 1927.

R. M. Johnson, superintendent of Mildred, Kan., plant, Consolidated Cement Co.

Ormrod Mill No. 3 of the Lehigh Portland Cement Co. earns unusual distinction in acquiring a record of two calendar years of safe operation because it is one of the older Lehigh properties and its organization contains many relatively old men—veterans in the company's service. To those who feel that the advantages are all with the new

William J. Montz, superintendent of Ormrod, Penn., No. 3 and No. 2 plants, Lehigh Portland Cement Co.

R. C. Matthews, superintendent of Cape Girardeau, Mo., plant, Marquette Cement Manufacturing Co.

mills and the younger men the Ormrod record constitutes a splendid lesson. In the Ormrod mill proper, accidents have been practically a thing of the past for several years. The last accident charged against the mill record occurred on September 8, 1927, in the electrical gang working jointly for the three Lehigh mills at Ormrod and a subsidiary street railway. Mill No. 3 was forced to assume a third of the gang's lost time. Ormrod No. 3 boasts 748 safe days.

R. G. Sutherland, superintendent of Houston, Tex., plant, Trinity Portland Cement Co.

The Ormrod organization have unusual cause for gratification at this time through the fact that Ormrod mill No. 2, an older unit than No. 3, also succeeded in completing 1929 without accident. The record at No. 2 has also been a very good one and it is believed that this mill is the oldest in the industry to which a trophy has been awarded. William J. Montz is in charge of both mills.

Superintendent Montz assisted as master mechanic with the building of Ormrod mills Nos. 2 and 3, and has been in charge of their operation since 1908. District Superintendent George Moritz, who with Mr. Montz has been known as a confirmed safety booster for years, is extremely proud of the Ormrod showing.

J. W. Ganser, assistant superintendent in direct charge of Dallas, Tex., plant, Trinity Portland Cement Co.

Texas—the state which captured the very first association safety trophy awarded in 1923—steps out with a two-year record at the Dallas plant of the Trinity Portland Cement Co. President W. H. L. McCourtie of the Trinity has two fancies—fast horses and safe operating records. Dallas plant has agreed to take care of the latter, under the guidance of Vice-President C. E. Ulrickson, General Superintendent O. V. Bartholonew and Chief Chemist J. W. Ganser, locally known as the "Safety Trinity." Dallas plant "signed off" on accident reports on November 26, 1927, and consequently has enjoyed 766 accident-free days of Texas sunshine since that time.

Ray S. Huey, superintendent of Duluth, Minn., plant, Universal Portland Cement Co.

"Down at the Cape," as Cape Girardeau, Mo., is familiarly known, Harry Cole, plant manager; "Bob" Matthews, superintendent, and "Safety" Greer, safety engineer of the Marquette Cement Manufacturing Co.'s plant, are leading a local celebration in honor of the completion of a second calendar year without lost-time accident. Up to January 1, 1930, the Cape Girardeau mill has 739 days without a lost-time entry due to personal injury. A year ago, on completion of the first safe year, the workers paraded through the

A. D. Stancliffe, general superintendent, southern division, International Cement Corp., in charge of Lone Star mills at Spocari and Birmingham, Ala., and New Orleans, La.

city and in conclusion pledged another year without accident. Now they have shown that they meant business. December 23, 1927, was the date of the last reportable accident.

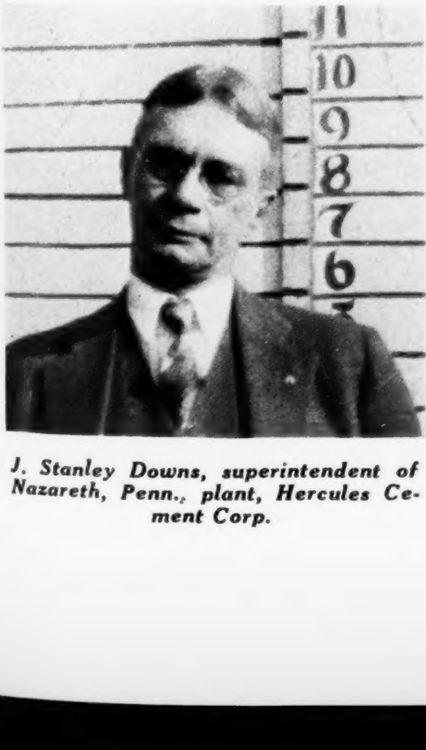
Duluth Wins Again—Third One-Year Record

The Duluth mill of the Universal Portland Cement Co. has captured the distinction of winning the association safety trophy for

W. M. Cabaniss, superintendent of Birmingham, Ala., plant, Lone Star Cement Co. (Alabama)

the third time intermittently, having completed perfect safety scores in 1925, 1927 and 1929. Duluth plant has had only three lost-time accidents since January 1, 1925. The electrical department of Duluth has operated without accident since the mill started up in 1916 and several other departments have remarkable records for the avoidance of accidents.

Superintendent Ray S. Huey and Safety Manager Gordon Huth have been receiving numerous congratulations. President Affleck, Works Manager Ahnfelt and G. A. Davis, manager of the department of safety and relief, are all enthusiastic over the Duluth record.



J. Stanley Downs, superintendent of Nazareth, Penn., plant, Hercules Cement Corp.

W. W. Deadman, superintendent of Spocari, Ala., plant, Lone Star Cement Co. (Alabama)

Sixteen Brand New Winners

Sixteen mills will receive the thrills of all first time winners—those who receive the association's handsome cast stone monuments. Mills which have won previously receive only a new inscription with each award after the first, having received the monument at the end of the first calendar year completed without lost-time, permanent disability or fatal accident.

Lone Star Cement Co., Alabama, Birmingham plant—H. Struckman, president; J. W. Johnston, vice-president and manager; A. D. Stancliffe, general superintendent; W. B. Cabaniss, superintendent. Date of last lost-time accident, March 14, 1928. Accident-free days, 657. This mill dropped from 40 accidents five years ago to two accidents in 1928 and then to an absolutely clear record in 1929.

Hercules Cement Corp., Nazareth, Penn.—Morris Kind, president; J. Stanley Downs, superintendent. Date of last lost-time accident, March 27, 1928. Accident-free days, 644. The Hercules accident record has shown a steady, consistent decrease since 1925, having suffered but one accident during 1928. President Kind has been an active safety enthusiast for many years, following the annual trophy contest with unusual interest.

Medusa Portland Cement Co., Toledo, Ohio—J. B. John, president; E. J. Maguire, vice-president; W. L. White, Jr., general superintendent; W. J. Worthy, superintendent; W. M. Powell, safety engineer. Date of last recordable accident, April 5, 1928. Accident-free days, 636. During the last three years accidents have shown a marked reduction at Toledo. In 1926 there were 19 accidents with 509 days' loss of time. In 1928 there were no lost-time accidents, but a fatal accident occurred on April 5 to mar an otherwise magnificent record. In 1929, the organization completed operations with no recordable accidents whatever. This mill and the Medusa gray cement mill at York, Penn., are the first two under the management of J. B. John to win the trophy. As chairman of the committee on accident prevention of the Portland Cement Association, Mr. John had had a covetous eye on the trophies for several years and the present record is very gratifying to him.

W. J. Worthy, superintendent of Toledo, Ohio, plant, Medusa Portland Cement Co.

Lone Star Cement Co., Alabama, Spocari plant—A. D. Stancliffe, general superintendent; W. W. Deadman, superintendent. Date of last lost-time accident, April 19, 1928. Accident-free days, 622. The perfect safety record of this plant in 1929 is highly gratify-

L. V. Robinson, superintendent of Victorville, Calif., plant, Southwestern Portland Cement Co.

ing. For the first time since the contest was inaugurated several years ago, both plants of a company having two plants, win the trophy for perfect records made by both during the same year.

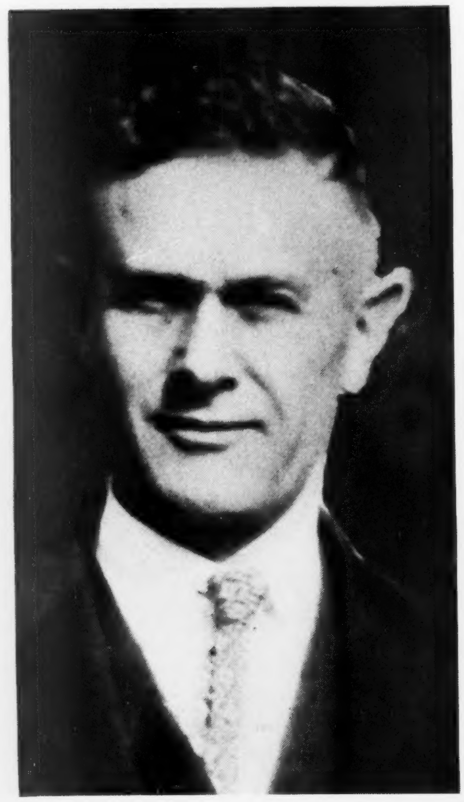
Southwestern Portland Cement Co., Victorville, Calif.—F. C. Powell, president; C. C. Merrill, vice-president in charge of operation; L. V. Robinson, superintendent; H. Sergeant, safety engineer. Date of last lost-time accident, July 6, 1928. Accident-

R. H. MacFetridge, superintendent of Birmingham, Ala., plant, Lehigh Portland Cement Co.

free days, 543. In 1926 Victorville plant suffered 64 lost-time accidents with over 1300 days' lost time. As the result of organizing a strong safety movement in the plant, accidents have been reduced precipitately each year since and 1929 ends without a single lost- time mishap in the plant during that year.

Lehigh Portland Cement Co., Ormrod (Penn.) mill No. 2—Col. E. M. Young, president; Daniel Ritter, vice-president; Henry A. Reninger, in charge of safety activities; George Moritz, district superintendent; William J. Montz, superintendent. Date of lost-time accident, July 25, 1928. Accident-free days, 522.

International Portland Cement Co., Spokane, Wash.—R. K. Neill, president; H. A. Heleniak, secretary; J. H. Neill, treasurer and superintendent. Date of last lost-time accident, July 31, 1928. Accident-free days, 518. The Spokane mill furnishes another example of consistent reduction during the last five years. In 1925 there were 18 accidents with loss of 861 days; in 1926, 14 accidents with loss of 376 days; in 1927, 5 accidents with loss of 500 days; in 1928, 5 accidents with loss of 67 days and in 1929 a



George F. Martinez, superintendent of Norfolk, Va., plant, Lone Star Cement Co. (Virginia)

complete absence of all accidents of all recordable classes.

Lehigh Portland Cement Co., Birmingham, Ala.—Daniel Ritter, vice-president; Henry A. Reninger, in charge, safety activities; R. H. MacFetridge, superintendent. Date of last lost-time accident, August 25, 1928. Accident-free days, 493. The Lehigh mill at Birmingham had only a single accident in

William Moeller, general superintendent, eastern division, International Cement Corp.

1926 and again in 1928 and has been a close contender for the trophy for several years. Mr. MacFetridge has rendered very distinguished service to the industry in several capacities connected with accident prevention work and his many friends are delighted to see his mill win the coveted award for 1929.

Lone Star Cement Co., Louisiana, New Orleans—L. S. Thompson, vice-president; A. D. Stancliffe, general superintendent; J. J. Oakes, superintendent. Date of last

J. J. Oakes, superintendent of New Orleans, La., plant, Lone Star Cement Co. (Louisiana)

lost-time accident, August 29, 1928. Accident-free days, 489. At the conclusion of its second complete operating year, the New Orleans mill, like the Great Lakes at Buffalo, the Medusa at York, Penn., and the Trinity at Houston, has reversed the belief that new mills have to have accidents. The clear safety records of the Lone Star mills at Birmingham, Spocari and New Orleans have more than usual significance from another point of view. All three of these mills are operated under the general direction of A. D. Stancliffe and this is the first occasion on which all the mills under any one general superintendent have won clear records in one year or at any time since the contest was started in 1923. Mr. Stancliffe, therefore, is entitled to hearty congratulations.

Lone Star Cement Co., Virginia, Norfolk, Va.—Dwight Morgan, vice-president; Wm. Moeller, general superintendent; George F. Martinez, superintendent. Date of last lost-time accident, April 9, 1927. Last permanent disability accident, September 21, 1928. Accident-free days, 466. The Norfolk mill has been a strong contender for trophy honors for the last three years, during which period it has suffered but two lost-time acci-

dents with a loss of 121 days and one partial disability accident without loss of time. The disability developed early this year as a result of a 1928 accident and after this mill had been announced as a 1928 trophy winner, making it necessary to withhold the award.

Lone Star Cement Co., Pennsylvania, Nazareth, Penn.—D. S. MacBride, vice-president; Wm. Moeller, general superintendent; E. C. Champion, superintendent; E. P. Schnerr, general mill foreman. Date of last lost-time accident, September 24, 1928. Accident-free days, 463. This mill, which was formerly operated by the Phoenix Portland Cement Co., has reduced its accidents conspicuously under present management. Mr. Moeller has been an active member of the committee on accident prevention of the Portland Cement Association for many years and was in general charge of operations of the Kansas Portland Cement Co. when that plant won an association trophy award in 1927.

Wabash Portland Cement Co., Osborn, Ohio—H. L. Jennings, secretary; Lester E. Palmer, works manager. Date of last lost-time accident, September 26, 1928. Accident-free days, 461. The Wabash mill at Osborn has had an excellent record in avoiding accidents since it started operation in 1926 and its name was expected to appear on the trophy list son almost as a matter of course. The Wabash mill at Stroh, Ind., is also making an enviable record, losing the trophy in 1929 by a single accident.

Trinity Portland Cement Co., Houston, Texas—O. V. Bartholomew, general superintendent; R. G. Sutherland, superintendent. Date of last lost-time accident, November 7, 1928. Accident-free days, 420. The Trinity plant at Houston is another of the "four

A. T. BeVier, superintendent of Buffalo, N. Y., plant, Great Lakes Portland Cement Co.

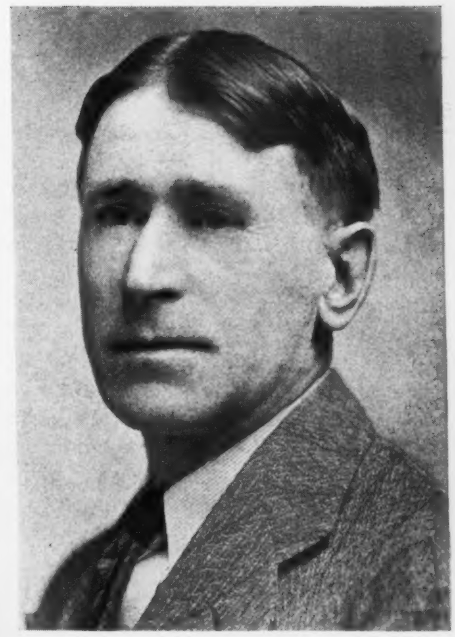
horsemen" which galloped through to a perfect safety record and a trophy award in second full year of operation. In 1928 this mill suffered 16 accidents, but a redoubling of safety efforts soon demonstrated the effectiveness of careful planning and hard work. As a result Houston is awaiting a great trophy dedication party in the spring for early summer.

Vulcanite Portland Cement Co., mill No. 3, Vulcanite, N. J.—W. D. Lober, president; W. R. Dunn, assistant to president and manufacturing director; S. Henry Harrison, assistant superintendent. Date of last lost-time accident, November 13, 1928. Accident-free days, 413. This mill has recently shown great improvement and a constantly dwindling number of accidents. Mr. Dunn has been prominently identified with the safety work of the industry for many years and

L. E. Palmer, works manager, Wabash Portland Cement Co., Osborn, Ohio

for a long time a member of the committee on accident prevention of the Portland Cement Association.

Medusa Portland Cement Co., York, Penn., gray cement plant—W. L. White, Jr., general superintendent; R. J. Landis, superintendent; W. M. Powell, safety engineer. Date of last lost-time accident, November 24, 1928. Accident-free days, 403. The York mill, which is only in its third year of operation, probably has the distinction of being the only modern cement mill built without a single lost-time accident. But it suffered five lost-time accidents in 1928, its first year of operation. Then in 1929 it tied with Toledo plant in the Medusa organization in a perfect score and matched the records of the Great Lakes plant at Buffalo, the Lone Star plant at New Orleans and the Trinity plant at Houston, by winning the trophy in its second full operating year.



R. J. Landis, superintendent of York, Penn., plant, Medusa Portland Cement Co.

Pacific Portland Cement Co., Redwood City, Calif.—Robert B. Henderson, president; J. H. Colton, vice-president in charge of operation; M. J. Johnsson, superintendent. Date of last lost-time accident, November 27, 1928. Accident-free days, 400. The Redwood City record is one which indicates persistent plugging. From 18 accidents with 205 days' lost in 1926, there has been a steady decline to the zero line, reached in 1929. A sister plant at San Juan Bautista has made a striking reduction in accidents during the same period, but unfortunately missed the trophy award in 1929 by a single accident.

Great Lakes Portland Cement Corp., Buffalo, N. Y.—Adam L. Beck, president; M. H. Hammond, vice-president; A. T. BeVier,

M. J. Johnsson, superintendent of Redwood City, Calif., plant, Pacific Portland Cement Co.

superintendent; J. B. Zook, chairman of safety committee. Date of last lost-time accident, December 19, 1928. Accident-free days, 377. During 1928, the first full year of operation, the Great Lakes plant suffered six lost-time accidents. Therefore its appearance among the trophy winners for 1929, with the other three plants only in their second year of operation, is a very gratifying feature of the contest.

Alpha Portland Cement Co., Martin's Creek, Penn., mill No. 3, completed 1929 without accident, but did not operate the minimum of six months required by the rules under which the trophies are awarded. The last recordable accident at this plant occurred on June 3, 1928. John L. White is the superintendent.

What Award Carries With It

Award of the Portland Cement Association safety trophy for accident-free operation throughout a calendar year carries with it a handsome cast stone monument designed by the Art Institute of Chicago and built by the Benedict Stone Corp., which is shipped to each winner of the award for the first time. Subsequent awards are acknowledged by placing new inscriptions on monuments already in place. Each winning plant selects two delegates to attend the spring meeting of the Portland Cement Association at New York and receive the formal award. At a later date a ceremony of unveiling and dedicating the trophy takes place at the winning mills in the presence of officials, neighboring industrialists, workmen and their families.

The tables below give the records of the cement mills operating in 1929 without an accident:

CEMENT MILLS WHICH OPERATED DURING 1929 WITH ONLY ONE RECORDABLE ACCIDENT

Company	Plant	Superintendent
Allentown Portland Cement Co.	Evansville, Penn.	D. C. Morgan
Alpha Portland Cement Co.	Manheim, W. Va.	W. L. Matthes
Alpha Portland Cement Co.	St. Louis, Mo.	F. R. Loveridge
Atlas Portland Cement Co. (The)	Independence, Kan.	C. M. Carman
Bessemer Limestone and Cement Corp.	Bessemer, Penn.	D. C. McKee
Canada Cement Co., Ltd.	Lakefield, Ont.	E. W. Bailey
Canada Cement Co., Ltd.	Pt. Colborne, Ont.	L. M. McDonald
Canada Cement Co., Ltd.	Exshaw, Alta.	W. D. Armstrong
Consolidated Cement Corp.	Fredonia, Kan.	Wm. Palmer
Diamond Portland Cement Co.	Middle Branch, Ohio	H. D. Raff
Florida Portland Cement Co.	Tampa, Fla.	C. E. Caron
Giant Portland Cement Co.	Egypt, Penn. (Reliance)	O. D. Havard
Lehigh Portland Cement Co.	Metaline Falls, Wash.	H. Helwig
Lehigh Portland Cement Co.	New Castle, Penn., No. 3	W. H. Kleckner
Lehigh Portland Cement Co.	Oglesby, Ill.	John Young
Lehigh Portland Cement Co.	Sandts Eddy, Penn.	James Gish, Jr.
Lehigh Portland Cement Co.	Union Bridge, Md.	G. S. LaForge
Lone Star Cement Co., New York	Hudson, N. Y.	C. S. Andres
Pacific Portland Cement Co.	San Juan Bautista, Calif.	F. F. Parker
Valley Forge Cement Co.	W. Conshohocken, Penn.	G. E. Newhard
Vulcanite Portland Cement Co.	Vulcanite, N. J., No. 2	W. R. Dunn
Wabash Portland Cement Co.	Stroh, Ind.	Glenn G. Hall
Yosemite Portland Cement Corp.	Merced, Calif.	A. P. deJonckheers

Ohio Lime Manufacturers Had Good 1928 Safety Record

THE December Bulletin of the Industrial Commission of Ohio contains the following interesting item:

"An editorial in ROCK PRODUCTS for October 12 states that every branch of the quarry industry with the exception of the lime interests improved its accident experience in 1928. This may be true for the country as a whole, but the lime industry in Ohio made gains in accident prevention. Lime burning operations (no quarrying) shows a frequency rate of 9.98 in 1928 as against 8.25 in 1927, a slight increase, but a decided reduction was made in severity, that of 1928 being 0.80 as compared with 1.02 in 1927. Lime quarrying (with or without blasting) had decreases in both frequency and severity. The frequency rate for 1928 was 25.98 as compared with 26.30 in 1927, while the severity rate in 1928 was 18.32 as compared with 20.59 in 1927. In view of the national situation, the lime industry of Ohio is to be congratulated."

J. W. Condrey Goes to Mexican Cement Plant

J. W. CONDREY, formerly with the Lone Star Cement Co., Louisiana, New Orleans, La., is now superintendent of operations of the Compania de Cemento Portland "Landa," S. A., Puebla, Mex. This is the same company of which A. J. Blank is general superintendent and supervising chemist.

RECORD OF CEMENT MILLS WHICH OPERATED WITHOUT ACCIDENT DURING 1929, SHOWING DATE OF LAST ACCIDENT IN EACH DEPARTMENT

	Cowell	Lehigh, Iola	Alpha, Ironton	Consolidated, Mildred	Alpha, Bellevue	Lehigh, Ormrod No. 3	Trinity, Dallas
Quarry	5-11-26	9-18-25	9-21-26	10-12-26	12-4-25	3-16-26	11-1-27
Clay field	*	10-5-20	*	*	*	9-23-18	*
Crushing	*	9-9-26	11-11-24	4-25-24	1-6-25	*	7-30-23
Raw	2-22-26	8-7-22	4-5-26	2-22-26	10-22-26	2-9-26	9-24-27
Burning	7-11-25	11-17-24	12-8-26	11-19-26	10-11-25	8-4-26	4-16-27
Finish	4-2-25	2-14-25	9-30-26	10-22-26	1-6-25	8-5-26	11-26-27
Coal grinding	*	11-20-25	2-25-25	9-2-25	11-4-24	11-26-24	3-16-22
Cem. stor.	7-5-20	5-18-21	3-9-23	9-24-25	5-1-23	*	*
Pack. and ship.	4-10-26	*	11-8-26	12-14-25	11-18-26	7-16-25	1-11-27
Power	*	8-31-20	*	2-11-26	1-5-25	6-25-23	4-19-24
Shops	11-14-22	10-8-25	8-23-21	12-13-26	7-8-26	1-6-26	2-2-27
R. R. (out)	8-29-22	6-18-19	*	2-25-26	*	2-23-26	*
Yard	4-11-24	10-10-25	11-25-24	3-19-27	4-16-27	2-15-27	7-13-27
Other than above	4-20-25	8-5-19	7-16-24	6-28-24	6-14-26	2-4-25	7-31-26
	Elec. dept.	Disman.	Plant lake		Constr.	Stone stor.	Mill
Date of last acc.	5-11-26	9-9-26	12-8-26	3-19-27	4-16-29	9-8-27	11-26-27
No. of days from last acc. to Jan. 1, 1930	1330	1209	1119	1020	990	847	766

*Last accident occurred before 1920.

	Lone Star, Penn.	Wabash, Osborn	Trinity, Houston	Vulcanite No. 3	Medusa, York	Pacific, Redwood	Great Lakes
Quarry	12-27-27			2-22-27	6-15-27	11-27-28	
Clay field							
Crushing	10-21-24			11-26-27	8-10-23		9-14-27
Raw	4-18-28	9-22-27	8-15-28	2-10-28	9-3-28	11-22-26	10-3-27
Burning	7-9-28	9-26-28	6-7-28	12-8-27	10-18-28	7-21-26	12-19-28
Finish	1-27-28		11-7-28			5-5-26	
Coal grinding	10-3-26	9-22-28		3-9-27			
Cem. stor.	10-17-25		8-22-28				8 7-28
Pack. and ship.	9-24-28	6-29-27	8-17-28	11-13-28	10-10-28	11-21-28	10-27-28
Power	10-10-25	5-25-27	7-13-28	11-12-26		8-28-28	8-16-27
Shop	10-18-26		4-12-28			11-16-28	7-26-27
R. R. (out)	12-7-21	8-29-27		11-9-26	12-8-24	1-12-27	8-13-27
Yard	12-30-26	7-19-27		1-18-27	11-24-28		6-14-28
Other than above	11-27-27	5-4-27	8-18-28	1-9-28	7-6-25	2-15-27	7-19-28
Date of last acc.	9-24-28	9-26-28	11-7-28	11-13-28	11-24-28	11-27-28	12-19-28
No. of days from last acc. to Jan. 1, 1930	463	461	420	413	403	400	377

	South-western, Vict'rville	Lehigh, Ormrod No. 2	Inter-nat'l, Ltd.	Lehigh, Birm.	—Lone Star— La.	—Lone Star— Va.
Quarry	4-10-28	10-10-25	7-31-28	8-1-27		
Clay field				2-2-24		
Crushing	5-20-27	5-30-24	4-22-26	3-12-27		
Raw	4-16-27	11-15-26	5-28-28	9-17-23		9-21-28
Burning	10-31-27	7-25-28	9-22-25	8-16-27	7-16-28	
Finish	10-24-27	2-8-27	4-14-27	5-19-25		
Coal grinding	11-27-26	3-4-25	1-25-27	9-4-25		
Cement storage	7-27-26					
Pack. and ship.	5-14-28	10-18-27	8-5-22	8-25-28		
Power	2-28-28	2-3-27		11-25-27		
Shop	11-30-27	4-12-28	9-30-25	10-20-25	8-29-28	
R. R. (out)	7-6-28	6-7-23	5-23-23	3-26-25		
Yard	9-21-27	1-2-25	7-23-27	4-15-24		4-9-27
Other than above	7-18-26	4-17-23	4-20-20		3-25-28	
Date of last accident	7-6-28	7-25-28	7-31-28	8-25-28	8-29-29	9-21-28
No. of days from last accident to Jan. 1, 1930	543	522	518	493	489	466

	Marquette, Cape Girardeau	Universal, Duluth	Lone Star Ala., Phoenix, Birm., Ala.	Hercules	Medusa, Toledo	Lone Star Ala., Spocari
Quarry	12-23-27		12-1-26	3-27-28	10-5-26	4-4-27
Clay field	6-25-26					
Crushing	10-12-27		12-14-25	8-20-26	11-28-26	
Raw	8-11-26		6-6-27	7-24-27	9-17-26	3-13-27
Burning	3-4-27	2-9-26	11-28-27	2-23-27	7-14-26	4-19-27
Finish	10-19-24		11-22-26	4-17-27	3-14-26	2-23-27
Coal grinding	10-27-26		11-13-25	9-24-27	5-17-25	
Cem. stor.	*		11-12-25		11-4-24	
Pack. and ship.	7-5-27		5-4-27	5-11-27	8-16-27	1-19-27
Power	10-10-24		3-24-27	12-2-26	4-5-28	5-8-26
Shop	2-16-24		8-10-27	9-6-26	5-18-26	3-17-27
R. R. (out)	9-7-25	1-6-28		1-7-21	12-17-24	
Yard	8-29-25		3-14-28	10-5-26	9-15-26	12-31-26
Other than above	4-12-24		12-8-26	8-8-26	8-9-23	1-27-27
	Store room					
Date of last accident	12-23-27	1-6-28	3-14-28	3-27-28	4-5-28	4-19-27
No. of days from last accident to Jan. 1, 1930	739	724	657	644	636	622

What the American Concrete Institute Has Done and Is Doing

That Is of Interest and Bears Vitally on the Business of Rock Products Producers

By Harvey Whipple
Secretary, American Concrete Institute

AGAIN the editor has asked me to tell you briefly what the American Concrete Institute has been doing in the last year which is significant to readers of ROCK PRODUCTS. Since I must take seriously the injunction to be brief, it is a large order for delivery in a small package.

In a broad sense the Institute can do very little in its special field which does not concern readers of ROCK PRODUCTS. Concrete cannot be made without two commercial raw materials—the aggregates and the cement to bind them.

For some years it may have appeared from the sidelines that the designers and makers of concrete were concerned most of all with the ratio of water to cement—that Professor Abrams' justly famous W-C ratio had come to imply a panacea for all our concrete ills.

That, however, is in the nature of things. We can concentrate on one thing at a time and while we are mastering the problems stressed by a newly stated fundamental principle we must seem to neglect some of its essential corollaries.

Of many of the special uses in the field of concrete we know very little. We took cement for granted—a standard specification product. And we took aggregates pretty much for granted save for a few specified copy-book characteristics. Two committees of the American Concrete Institute remind us that we must make a fresh start in the accumulation of data before the way will be entirely clear for the best use of these two materials.

Cement as a Variable Material

"Variations in Standard Portland Cements," a report of Committee 202, P. H. Bates, author-chairman, recently published in the *Journal of the American Concrete Institute* stresses the fallacy of the assumption in most of the concrete field's investigational work that the cement is not a variable. It was assumed, under the standard specification, to be a constant in concrete with all the variables attributable to the other ingredients, to the processing of the mix and its curing conditions. The report fills 30 pages and discussion five more. All that can be recorded here of its confessedly incomplete evidence that cement is a variable to be reckoned with, is in these lines: "this discussion will have served its most useful purpose if the importance of certain properties and the meagerness of data covering them are so sufficiently impressed upon even a very few readers that they will originate an intensive study to fill up the outstanding gaps in our incomplete knowledge of cement."

This report will be thrown open to general discussion at the Institute's 26th annual convention in New Orleans, February 11-13.

This subject is further emphasized in the report of Committee 803—Disintegration of Concrete, G. M. Williams, author-chairman. In summarizing available data on the committee's assignment, the report has as one of its concluding injunctions in making concrete to be exposed to alkali salts: "Select a portland cement which has a high natural resistance as measured by preliminary tests."

New Investigations on Aggregates

From Committee 202, Aggregate Specifications, comes unofficial word in different form. The committee is charged with the duty of further perfecting the Institute's "Tentative Purchase Specifications for Concrete Aggregates." It sends back word to the Advisory Committee that it has "found it necessary to suspend work temporarily on the perfection of aggregate specifications in order to prepare a new program for a fresh line of attack, involving investigational work before specifications may be further developed."

Here then, we have our attention directed to the two major ingredients of concrete. We have debated how to use them, how to combine them; now we are faced with a necessity to learn something about those ingredients, their varied characteristics and behavior.

The Institute has before it a new proposed "Construction Specification for Concrete Work on Ordinary Buildings"—the work of Committee 502—Mixing and Placing Concrete on Buildings, Arthur R. Lord, author-chairman.

It is a new type of Institute specification intended for direct embodiment by architects and engineers in contracts.

It insists on fine and coarse aggregates of definite fineness modulus and for a constant source of supply. Article 9 provides:

Having determined upon the source and kind of cement and aggregates to the satisfaction of the architect or engineer, this contractor shall secure his entire supply of each material from the same source so as to maintain the same quality and grading throughout the work. Should it become necessary to change the source or characteristics of the materials used this shall only be done after additional proportioning tests have been completed for the new materials and subject to such safeguards as the architect or engineer may impose for the maintenance of the quality of the concrete in all respects.

Admixtures and Special Cements

It puts upon the advocates of admixtures and of special cements (article 10) the burden of proof of their value:

Nothing shall be added to the essential ingredients of concrete (portland cement, fine and coarse aggregate, and water) without the approval of the architect or engineer in writing and then only such materials shall be added as have been thoroughly tested by reputable independent investigators so as to demonstrate their effect on the strength, elastic properties, permeability and permanence of concrete produced from materials such as are being used on this work.

No special cement shall be used in place of standard portland cement except upon the same basis of adequate test and known effect upon all vital properties of the resulting concrete.

Whenever such admixtures or special cements are approved for use on this work in this manner they shall be used in accordance with the manufacturer's instructions and in conformity with their use in the tests on which their acceptance is based.

Supply Source for Each Individual Job Should Be Constant

In a discussion of the provision for constant source of supply, the author-chairman in supplemental discussion says:

The requirement that a constant source of supply for all materials be maintained on each job is also a hard provision for material dealers to "see." The practice of swapping orders and of delivering to the job whatever material is handiest, is doubtless good business for the material dealer, but it costs the contractor far more in labor of handling concrete (to produce proper results) than it saves the dealer. Economical concrete placing (no less than uniform concrete quality) requires that the consistency of the concrete be uniformly maintained at just the right flow for easy placing without segregation. Variation in the grading of

aggregate or in its source almost invariably upsets this condition and repeated variations make quality concrete most difficult, if not at times impossible to obtain. This provision is vital to this specification.

Of admixtures he has the following comment:

Admixture manufacturers and salesmen will not enthuse over article 10. We have meagre reliable information on most admixtures—practically nothing but salesmen's loose talk on others. The instructions on the printed label are sometimes absurd. Any product that has been on the market as long as this ought to be less of a secret-formula patent medicine and more of a staple article. The tests that are known are none too encouraging and many large corporations which have made tests for their own information and have decided to dispense with most admixtures as a result, are unwilling to publish their data for the benefit of the rest of us. I feel that this specification contains the only sensible provision that can be made in the present situation. If generally accepted it should lead to the accumulation of adequate and reliable test data to supplement the widely variable data of experience now generally circulated — the favorable opinions being circulated by salesmen and the unfavorable by other salesmen.

This specification is also on the convention program for discussion at New Orleans.

Ready-Mixed Concrete

Two committees are studying central mixing and centrally mixed concrete—one to consider the design and operation of central mixing plants, the other to prepare a specification under which centrally mixed concrete may be purchased.

Light weight aggregate looms up, as the subject matter of important study. Cinders and burned clay assume daily a larger importance not only in the field of concrete masonry units but in reinforced-concrete building construction. A thorough study of their advantages, their variability and of the peculiar problems which they inject into the making of concrete, is an early probability.

These it seems are the high points of interest to Rock Products readers in the present Institute program and they are only the high points. The Institute's program is no longer an annual three-day matter. The monthly publication of its literature, has developed a larger channel of activity. In all the expanded program in relation to concrete is really nothing alien to those who produce raw materials from which concrete is made.

Reorganize Georgia-Quincey Granite Company

THE reorganized Georgia Quincey Granite Co. that has for 40 years operated quarries in Hancock County, Ga., the quarries having been shut down for the last several months, resumes quarry operations shortly with Frank L. Stewart as quarry superintendent. Prospects are that the quarries, located at Granite Hill, will in the future be operated on a larger scale than ever before, the report states.

The majority of the stock of the Georgia-Quincey Granite Co., a Macon, Ga., corporation, has been bought by C. J. Bailey, a South Carolina granite quarry promoter, and will be operated by him through agents of the company who have been retained in the company service. Joseph A. Reynolds of Macon is retained as president of the company and Frank L. Stewart continues as quarry superintendent.

During late years these quarries have furnished the city of Augusta much of the granite used in city improvements and practically all of the granite used in construction of the Savannah River levee at Augusta.—*Augusta (Ga.) Herald.*

Rock Products Industries Represented on National Advisory Committee

FOLLOWING up the Hoover Conferences designed to stimulate business, particularly the construction industry, a permanent advisory committee of industrial leaders has been appointed to help maintain normal industrial activity. On this committee the rock products industries are represented by F. D. Coppock, president of the American Aggregates Corp., Greenville, Ohio, representing the National Sand and Gravel Association; Otho M. Graves, vice-president of the General Crushed Stone Co., Easton, Penn., representing the National Crushed Stone Association; Frank H. Smith, president of the Lawrence Portland Cement Co., representing the Portland Cement Association, and Charles Warner, president of the Warner Co., Philadelphia, Penn., representing the National Lime Association.

The committee consists of about 160 industrial leaders from all branches of industry. The members of the committee will be asked to report from time to time on the condition and outlook of the trades and industries they represent, with a view to disclosing the major trends in business, and whether there are weaknesses in the national economic structure, it was stated.

These reports will be submitted to the executive committee of the conference and will form the basis for determining whether corrective measures are necessary and practicable. Through the committee just formed, which will be known as the Business Survey Conference committee, the individual members of trade associations will be informed of whatever measures are adopted, the conference announced.

To determine the further steps to be taken in carrying out the purposes of the conference the latest information concerning business activities and the immediate outlook, the members of the advisory committee are to report briefly on the situation in their respective fields at once.

Richard K. Meade Honored

RICHARD K. MEADE, chemical and industrial engineer, Baltimore, Md., was given a complimentary dinner at Easton, Penn., January 7, by Prof. Edward S. Hart, head of the Chemical Publishing Co., as a testimonial to the remarkable success of his book, "Portland Cement," which has been accepted the world over as the standard work on portland cement manufacture.

The dinner was not a large one, but among the cement men present were G. S. Brown, president, and Louis Anderson, chemical engineer, the Alpha Portland Cement Co.; Joseph Brobston, vice-president, Nazareth Portland Cement Co.; Lester C. Hawk, chemist, and Wm. P. Gano, assistant general manager of the Pennsylvania-Dixie Cement Corp. Others who were present besides Professor Hart were President Wm. Mather Lewis of Lafayette College, Hon. E. J. Fox of the Pennsylvania supreme bench, Hon. Russell Stewart of Easton and Hons. Robert Stotz and Wm. McKeen, judges of the local court. Speeches were made by Professor Hart and Mr. Brobston and reply by Mr. Meade.

J. A. Murray Now Director of Research, Warner Co.

J. A. MURRAY, for many years connected with lime investigations of the National Bureau of Standards, has resigned to become director of research for the Warner Co., Philadelphia,. Mr. Murray by his long experience and training is admirably fitted for his new position and some interesting developments in lime technology are expected to ensue from the Warner laboratories.

A. R. Wilson

THE RECENT sudden death of A. R. Wilson, president of the Granite Rock Co., Watsonville, Calif., leaves a gap in the ranks of the crushed stone producers which will be hard to fill. For many years western regional vice-president of the National Crushed Stone Association, prominent at the annual conventions, his leadership will be missed. He had a host of friends—indeed, every one who had the pleasure of knowing him to a degree always was proud to own A. R. Wilson as a friend.

A truly "native son," Mr. Wilson attended the public schools in California and later went east to college, graduating as an engineer from the Massachusetts Institute of Technology, Boston, Mass. After a short engineering career he became interested in the crushed stone business; his engineering training was applied in good stead to the Granite company's operations.

The 1930 convention is coming soon and "A. R." won't be there, but his friends and associates will do honor to his memory—as a real friend

American Aggregates Sells Chillicothe, Ohio, Holdings

ACCORDING to the *Chillicothe* (Ohio) *Scioto-Gazette*, the American Aggregates Corp. has sold all its holdings in Chillicothe to the Chillicothe Sand and Gravel Co. The properties comprise 118 acres of land. It is understood that the transfer marks the creation of an enlarged scope of activity for the Chillicothe Sand and Gravel Co., which plans to build a large, up-to-date plant at Chillicothe which will permit it to deliver gravel within a radius of 300 miles.

New equipment has been ordered and will be placed early in the new year. Railway shipping facilities are also contemplated as some of the improvements of the new concern.

Ruth Company Installs Modern Gravel Plant at Vineland, N. J.

A MODERN electrically-operated sand and gravel plant has been recently put into operation at Vineland, N. J., by the Ruth Concrete Products Co. Concrete gravel, one of the principal products, will be shipped by rail over the Central Railroad of New Jersey; a siding to the main track is under construction. The Ruth company also operates a cement block and brick plant. Gravel products will be marketed through brokers or dealers. B. W. Coleman is president of the company; J. D. Spiegel, secretary, and E. R. Jones, treasurer.

H. D. Baylor Advanced

H. D. BAYLOR, superintendent of the Speed, Ind., plant of the Louisville Cement Co., has been elected vice-president of the company to succeed Senator F. M. Sackett, resigned. Senator Sackett's resignation was occasioned by his impending absence from the country to serve as ambassador to Germany.

Mr. Baylor has been in the employ of the Louisville Cement Co. for more than 20 years. He is a graduate chemical engineer and for several years has been superintendent of the plant at Speed, Ind., where he makes his home.

Dewey Portland Employes Hold Bonus Banquet

EMPLOYES of the Dewey Portland Cement Co. plant at Linwood, Iowa, who by virtue of having been with the company for at least a year were entitled to a bonus, held their annual party at the Buffalo Community hall on January 4, 1930. More than 300 employes and their wives attended the program and the dinner, which was served by the ladies of the Catholic church.

Later the hall was cleared for dancing and 200 more employes of the company and their friends joined the crowd for the remainder of the evening.

Bonus checks, ranging from 3% to 7% of the annual pay of each person and totaling nearly $12,000, were distributed, marking the tenth annual dividend of this nature paid by the company. The company has followed the plan for the last ten years of paying a bonus when a profit of 10% for the stockholders has been earned. One-year employes get 3% of their annual pay; two-year employes draw 4%; three-year employes, 5%; four-year, 6%, and five-year or longer, 7%.

Need for greater efficiency to insure the payment of a bonus next year, due to the drop in the price of cement in the country, was stressed by F. E. Tyler, Kansas City, president of the company, in a talk following the dinner party.—*Davenport* (Iowa) *Democrat.*

G. H. Faist to Manage Toledo Office of Washington Lime

G. H. FAIST, formerly sales manager for the Woodville Lime Products Co., Woodville, Ohio, has been appointed western

G. H. Faist

sales manager of the Washington Building Lime Co. in charge of the Toledo office. Mr. Faist has been connected with the finishing hydrate industry for 25 years, the last 15 of which were with the Woodville Lime Products Co., from which company he resigned in September, 1929. The sales in all of Ohio, Indiana and Michigan, lower Ohio and territory west will be covered from the Toledo office.

Pacolet Quarry Holdings Bring $40,100 at Receiver's Sale

BIDDING $40,100, R. E. Plymole of Clarendon, Va., chairman of the bondholders' committee holding bonds of the Southern Consolidated Granite Corp., received the properties of the Pacolet, S. C., rock quarries recently when they were sold at public auction by A. E. Tinsley and R. E. Babb, receivers. The minimum price at which the property would have been sold was $40,000. The property includes 269 acres and all machinery and buildings used in operation of the quarry.

The new owners plan to resume operation on a larger scale in the near future, it is understood.—*Spartanburg* (S. C.) *Herald.*

Large Quarry to Be Developed in Southern Illinois

THE RECENT purchase of 40 acres of quarry property on the Mississippi river near Grand Tower, Ill., is taken as an indication of the probable erection of a $1,000,000 limestone processing plant, according to a report in the *Herrin* (Ill.) *News.* The property, which was bought for $10,000 and lies along the river, includes part of the Big Hill known as the Devil's Back Bone, a limestone formation said to contain 5,000,000 tons. The stone is to be quarried, cut for building purposes, some crushed for construction material and some reduced to agriculture limestone for use on farms.

H. K. Ferguson and Co., of Cleveland, Ohio, bought the tract, M. M. Moralee of Murphysboro acting as agent. The Illinois Central railroad touches the land, the Missouri Pacific is a mile or two to the east, the Frisco is across the river and the Mississippi washes the west boundary of the land, providing water transportation.

Clark P. White

CLARK P. White, treasurer and general manager of the Cook Stone Co., Hopkinsville, Ky., was found dead in his home on Christmas night. His death was attributed to accidental gas poisoning, indications pointing that Mr. White had probably attempted to light a new gas oven in the kitchen and inadvertently left a jet open. Later, it is believed he retired to the living room to read and was overcome by the escaping gas. Discovery of his death was made by a neighbor who investigated the constant burning of the electric lights since Christmas eve.

Surviving Mr. Clark are his widow, who had left just before his death on a visit to Cleveland; three sons, William, Carl and Rob, all of Hopkinsville; two daughters, Mrs. Andrew Fianz, and Mrs. Gut Roth, both of Boonville, and four brothers, Cliff, Charles, Clarence and W. F. White—*Evansville* (Ind.) *Courier.*

Foreign Abstracts and Patent Review

Determination of Calcium Oxide in Quicklime. Direct titration gives very low results, owing to the slowness with which the oxide dissolves. The phenol and ammonia methods also give low results, though the error is less; the ammonia distillation method is more accurate still, but again gives low results. Boiling with excess of standard acid and back-titration, combined with carbonate determination, gives quite accurate results.—*Chem. Weekblad* (1929) **26,** 511.

Porous Gypsum Products. An alkaline-earth (calcium) chloride and an organic acid yielding an insoluble calcium salt, *e.g.*, tartaric acid, are added to gypsum containing carbonates so that on mixing the product with water, carbon dioxide is evolved slowly and a hard, porous mass is obtained on setting.—*British Patent No.* 298,607.

Tests of Stokes' Law for Non-Spherical Particles. Andreasan studied the settlement of flint particles in water, obtaining data on actual size-frequency distribution by means of planimeter and microscope. Values for grain size obtained microscopically were found to agree fairly well with those from application of weight data and Stokes' law. This is held to verify the assumption that Stokes' law applies to non-spherical particles. The investigation apparatus is described and also the method of removing samples from the settling chamber at definite intervals.—*Kolloid-Zeitschrift* (1929) **48,** 175.

Improved Clinker Cooler. The velocity of the air admitted to the cooling drum of rotary cement kilns is raised and the cooling effect consequently increased by the installing of a nozzle-shaped opening at the cooling drum outlet, into which the compressed air pipe which supplies the cooling air, is inserted like a jet blower. The clinker gathers at the narrowed section and thus comes in intimate contact with the air.—*G. Polysius, German Patent No.* 482,357.

Slag Building Material. Mixtures of hard-sintered refuse slags with bituminous binders are compressed into blocks.—*British Patent No.* 298,159.

Porous Building Materials. Portland cement, etc., is beaten up to a frothy pulp with hot or cold, dilute, aqueous solutions containing wetting agents comprising sulphonated organic compounds containing at least six carbon atoms in the molecule, *e.g.*, Turkey-red oil, or sulphonated tall oil, higher fatty acids, mineral or tar oils, alkylated aromatic hydrocarbons, and the products are cast in special designed molds—*British Patent No.* 319,103.

Quality Formula for Cement. Kuehl considered the following formula as giving the "best" cement composition: $CaO = 2.8\ SiO_2 + 1.1\ Al_2O_3 + 0.7\ Fe_2O_3$. By introducing the hydraulic modulus H, the silica modulus S and the iron modulus E into the above formula, Nilsson changes this formula to the following:

$$H = \frac{2.8 \times S \times (E+1) + 1.1 \times E + 0.7}{(S+1) \times (E+1)}$$

The formula contains the three moduli H, S and E, and after fixing, for example, S and E, H is also determined definitely. The H values for various S and E values are given in Table I; these values may be

TABLE I. H AND S VALUES AT DIFFERENT E VALUES

E = 0		E = 1		E = 2		E = 3		E = 4	
S	H	S	H	S	H	S	H	S	H
1	1.75	1	1.85	1	1.88	1	1.90	1	1.91
2	2.10	2	2.17	2	2.19	2	2.20	2	2.21
3	2.27	3	2.32	3	2.34	3	2.35	3	2.35
4	2.38	4	2.42	4	2.43	4	2.44	4	2.44
5	2.45	5	2.48	5	2.49	5	2.50	5	2.50
6	2.50	6	2.53	6	2.54	6	2.54	6	2.55

plotted, drawing the E values as curves of the abscissa S and the ordinate H. In evaluating a given cement or clinker analysis one can determine, after calculating the three moduli by use of the modulus formula or the diagram, how closely the hydraulic modulus approaches the ideal value. The quotient of the actual and the ideal H gives, so to speak, the theoretical "quality factor."—*Zement* (1929), **18,** 47.

Russian Cement Manufacture. Peters describes the demand, production and export of cement in Russia. The properties of the Noworossijsk cement are given.—*Zement* (1929), **46, 47.**

Trass as an Admixture. The advantages of trass as a concrete and mortar admixture are discussed in a publication of the German Trass Union, Andernach a. Rhine.—*Baumarkt* (1929), **28,** 48.

Manufacture of Cement in France. Blin describes the French processes for manufacture of "grappier" cement, slag cement, natural portland cement, white cement and iron portland cement.—*Technique Moderne* (1929) No. 6.

Structure of Tricalciumsilicate. Jaenecke defines "tricalciumsilicate" as a mixture of CaO and $2CaO{\cdot}SiO_2$; and Guttmann and Gille insist that it is a mixture of bicalcium-silicate and free lime. The former contends that his x-ray pictures are not inaccurate and the latter present proof to the contrary. *Zement* (1929), **18,** 48.

Cement Storage Silos. Schott describes and illustrates typical designs of cement silos, including those of Polysius, Miag, Amme and Macdonald.—*Zement* (1929) **18.**

Kl-Storage. Gensbaur has compiled a 70 page book, "Retrogressions of Strength of Cement and Concrete; Results of the Discussion of Kl-Storage." The book can be obtained from Baumarkt, Leipzig, for R.M. 9.30.—*Baumarkt* (1929), **28,** 48.

Deviations in Cement Testing Results. Palomar states that the deviations in the results of the cement tests in various laboratories are in some cases more than 50%. He points out the serious effects these different results have on the various brands of portland cement both to manufacturer and consumer. The personal element, or the test operator, is a vital factor in obtaining more uniform results; standard laboratory equipment is considered indispensable. It is suggested that Spain make the first step towards a world standard of analyzing and operating methods at the 1930 International Congress at Liege. The establishment of a testing and research laboratory for cements and concretes, to be regulated and inspected by the portland cement manufacturers, is urged for Spain.—*Cemento* (1929), **1,** 6.

Kuehl Lectures at Moscow. Upon special invitation by the Russian government, Dr. Kuehl, German cement technologist, gave six lectures at Moscow. These were: "The Path of Cement Research" (*Tonindustrie-Zeitung,* **53, 77**); "The Theory of Cement Burning" (78); "The Constitution of Portland Cement Clinker (89); "The Hardening Problem and Its Significance for Cement Research" (95); "The Chemistry of High Grade Cement," and "The Technology of High Grade Cement." Naturally it was not intended to make public in these lectures new data from cement research; the author merely assimilated already known data under various lecture topics. The series of six lectures, a historical review of the cement research data produced by investigations in various countries, is to be published in book form.

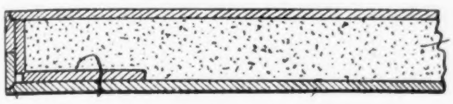
Existence of Monocalcium Aluminate in Solution. Travers and Schnoutka state that when a solution of any aluminum salt is treated with lime water, the following distinct phases in the reactions occur: (1) Formation of a precipitate of hydrated gelatinous alumina; the precipitation is quantitative if three molecules of lime to every one of alumina are used. (2) If a fourth molecule of lime water is added, the precipitate disappears entirely. (3) Addition of an excess of lime water produces crystals whose form varies with the concentration of the solution. In a very diluted medium the precipitation is slow, but leads to very clean crystals.

The impossibility of concentrating the solutions of monocalcium aluminate, without the decompositions, is a result of the poor solubility product of the polycalcium aluminates, which are much less soluble than the monocalcium. These last form by action of the lime liberated on hydrolysis of the undecomposed monocalcium aluminate.—*Cement* (1929), **34**, 11.

Recent Process Patents

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.

Protected Edges for Gypsum Boards. The object of the invention is to provide a board, and a method of making the same, wherein the side edges of the board will be



Protected edges on wall board

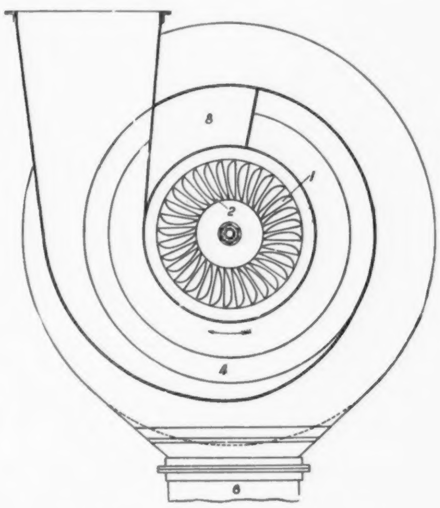
protected, but in such manner that the edges will be plane, and perpendicular to the faces of the board, and will be alike and unmarred, so that either may be displayed in the erection of the boards.—*Clarence W. Utzman, assignor to United States Gypsum Co., U. S. Patent No.* 1,731,116.

Light Weight Plaster Board. This invention relates to a method of and machine for making plasterboard by the incorporation of foam in the core forming material. The use of a foam to produce light weight core for plasterboard with standard machines has met with difficulty. If more than 1½ cu. ft. of foam is added to 1000 sq. ft. of board, the excess foam occasionally causes blisters. This is due to the incomplete incorporation of the foam into the water-stucco mix.

This invention provides a means which can be added to the standard machine whereby the quantity of foam added may be increased to lessen the weight of the product without danger of blisters. The method comprises the placing of a number of rotating-cage type agitators and a roller along the mixer belt of the board forming machine. These agitators and the roller are inserted in advance of the mixing fingers of the machine or may do the mixing entirely themselves.

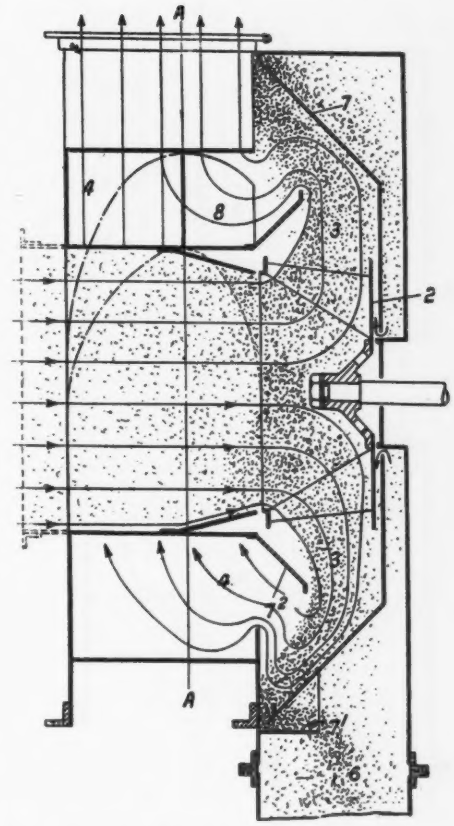
The drawing is a plan view of a portion of the mixer belt of a standard board machine showing the agitators and roller in place.—*William E. Lovett, assignor to United States Gypsum Co., U. S. Patent No.* 1,733,-741.

Centrifugal Dust Collector—A dust collector of the centrifugal type, but of a somewhat novel form, has as the active member a fan in a casing of a much larger diameter. The dust is drawn into the fan through a central cylinder and thrown against the inner wall of casing from which it slides down to a discharge. "Skimmers" on this inner wall assist in the collection of the dust and its discharge. The air leaving the casing is passed through a helical duct, that surrounds the central tube to a stack or



Centrifugal type dust collector

other discharge into the air. A flat, truncated cone in the casing is used in the form illustrated for directing the dust-laden portion of the air so as to reverse the flow and assist in dropping the dust. Another conical portion, attached to the tube through which the dust-laden air enters, prevents the current of air from the fan from short circuiting and going directly into the helical passage without dropping the dust in the casing. The fan and casing are vertical so the dust accumulated in the casing goes by gravity

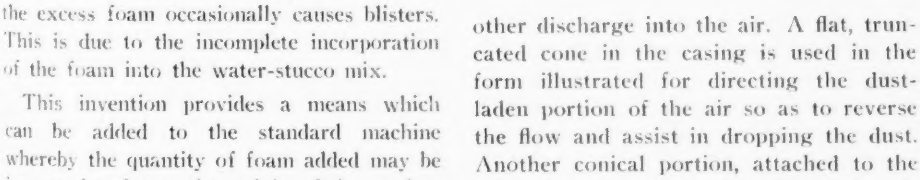


A section through the dust collector

to the discharge. Any form of collector may be used below this discharge. As a certain amount of air has to be separated from the dust in the casing, arrangements are made for a small return current through openings near the center. This part of the flow is in closed circuit, carrying a certain amount of dust, but there is no connection with this flow and the flow to the stack. The device is evidently intended to collect flue dust or to collect the fly ash from boiler installations.—*George Keith, U. S. Patent No.* 1,682,285.

Separating Solids from Liquids. A new type of centrifugal separator has four vertical screens revolving in a casing. The mixture of liquids and solids flows out of a central pipe and across the face of the screen so that only the liquids will go through. The solids do not cake on the screen, according to the inventor, but move across it to the outside. The farther away they move from the center the greater the centrifugal force and the dryer the pulp becomes. When it reaches the edge of the screen it is removed by vertical scrapers which have a different speed of revolution from the screens, and this differential is important in the operation of the machine.

The screens are opposed by surfaces having ridges which fill up with solids, and their number and position is important in controlling the flow of the solids. The liquid escapes through pipe-like channels behind the screens and falls into an annular pan below.—*H. C. Behr, U. S. Patent No.* 1,727,855.



Plan of standard wall board machine equipped with special agitators and rollers

Traffic and Transportation

Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly car loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

	Limestone Flux Week ended		Sand, Stone and Gravel Week ended	
District	Dec. 14	Dec. 21	Dec. 14	Dec. 21
Eastern	2,062	1,805	3,768	2,201
Allegheny	2,248	2,296	4,735	3,109
Pocahontas	249	239	739	505
Southern	690	525	7,118	5,886
Northwestern	559	569	1,297	1,012
Central Western	548	498	7,477	5,293
Southwestern	325	393	5,987	3,864
Total	6,681	6,325	31,121	21,870

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1928 AND 1929

	Limestone Flux		Sand, Stone and Gravel	
	1928	1929	1928	1929
	Period to date		Period to date	
District	Dec. 22	Dec. 21	Dec. 22	Dec. 21
Eastern	149,160	164,159	552,505	551,526
Allegheny	174,257	176,864	373,304	364,834
Pocahontas	22,893	18,794	41,185	50,082
Southern	29,760	30,866	535,352	438,014
Northwestern	64,350	54,829	321,336	303,415
Central Western	22,717	26,624	505,258	526,917
Southwestern	20,554	25,330	321,138	345,895
Total	483,691	497,466	2,650,078	2,580,683

COMPARATIVE TOTAL LOADINGS, 1928 AND 1929

	1928	***1929***
Limestone flux	***483,691***	***497,466***
Sand, stone, gravel	***2,650,078***	***2,580,683***

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning January 11:

CENTRAL FREIGHT ASSOCIATION DOCKET

23585. To establish on **crushed stone and crushed stone screenings**, carloads, from Narlo, O., to Kokomo, Ind., rate of $1.45 per ton. Route—Via N. Y. C. & St. L. R. R. direct. Present rate, 19½c.

Sup. 1 to W. D. A. 23367—Withdrawal notice. White Docket Advice 23367, Docket Bulletin 1690, of November 25, 1929, covering proposal to cancel existing commodity rates on **burnt or refuse foundry sand**, from Detroit, Mich., to various points, is hereby withdrawn from the docket.

23610. To establish on **crushed stone**, carloads, from Thrifton, O., to points in Indiana and Ohio, rates per net ton as shown below:

To	Prop.	Pres.
Dabney, Ind.	$1.25	$1.35
Dillsboro, Ind.	1.15	1.35
Aurora, Ind.	1.10	1.35
Lawrenceburg, Ind.	1.10	1.35
Columbia Park, O.	1.05	1.10

23611. To establish on **sand and gravel**, carloads, from Allison Branch, Ill., to Worthington, Ind., rate of $1.05 per net ton. Present rate, $1.12 per net ton via Washington, Ind., and E. I. & T. H. railway.

23612. To establish on **sand and gravel**, in open-top cars, carloads, from South Lebanon, O., to destinations on the B. & O. R. R., rates as shown in Exhibit A attached. Present rates, classification basis.

EXHIBIT A

To B. & O. Destinations in Ohio
Ohio Division
(Main Line—Cincinnati—West)

	Prop.		Prop.
Finney	85	Columbia Park	85
Route via Cincinnati, O. (Main Line—Cincinnati—East)			
Madeira	80	East Monroe	85
Blanchester	80	Greenfield	90
Midland City	80	Harpers	90
Martinsville	80	Musselman	95
New Vienna	80	Chillicothe	100
(Midland Branch)			
Cuba			80
Route via Loveland, O.			
Bloomingburg	85	Pleasant Corners	95
Mt. Sterling	90	Broad Street	100
Route via Washington C. H., O. (Hillsboro Branch)			
Westboro	80	Hillsboro	85
Russells	80		
Route via Loveland, O. (Toledo Division) (Main Line)			
Glendale	80	West Middeltown	80
Hamilton	80	Poast Town	80
Overpeck	80	Carlisle	85
Trenton	80	Miamisburg	85
Route via Middletown, O. (Wellston Branch)			
New Jasper	80	Milledgeville	85
Jamestown	80	Cunningham	90
Route via Xenia, O.			
McLean	85	Austin	90
Fairview	90		
Route via Washington C. H., O.			

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

23627. To establish on **limestone, crushed or ground** (See Note 3), but not less than 40,000 lb., from Valmeyer, Ill., to representative points shown below, rates as shown below (present rate, sixth class; proposed, 65% of sixth class):

(Rates in cents per ton of 2000 lb.)

To	Pres.	Prop.
Akron, O.	610	400
Columbus, O.	540	350
Cincinnati, O.	500	330
Cleveland, O.	610	400
Toledo, O.	570	370
Youngstown, O.	640	420
Detroit, Mich.	590	380
Grand Rapids, Mich.	590	380
Evansville, Ind.	370	240
Fort Wayne, Ind.	520	340
Indianapolis, Ind.	440	290
South Bend, Ind.	520	340
Louisville, Ky.	470	310
Pittsburgh, Penn.	700	460

23678. To establish rates on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica), carloads (See Note 3), from Butler, Penn., as indicated below, rates in cents per 2000 lb.:

	Proposed Rates		Present Rates	
To	Open Top Cars	Box Cars	Open Top Cars	Box Cars
Alliance, O.	120	138	150	150
Ashtabula, O.	100	115	120	120
Canton, O.	120	138	160	160
East Liverpool, O.	100	115	150	150
Elyria, O.	130	149	140	140
Lorain, O.	140	161	130	130
Medina, O.	120	138	150	150
Salem, O.	110	127	120	120
Steubenville, O.	100	115	110	110
Warren, O.	90	104	100	100
Youngstown, O.	80	92	100	100

23681. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) **and gravel**, carloads (See Note 3), from Columbus, Ind., to Fleming and Hayden, Ind., rate of 80c per net ton. Present rate, 85c per net ton.

23683. To establish on **sand and gravel**, carloads (See Note 3), from Hamilton, O., to Dayton, O., rate of 60c per net ton. Present rate, 75c per net ton.

23684. To establish on **sand and gravel**, carloads (See Note 3), from Gravel Bank and Marietta, O., to points in West Virginia, rates as shown in Exhibit A attached. Present rates, as shown in Exhibit A.

EXHIBIT A

Sand and Gravel, carloads, from Gravel Bank and Marietta, O., to B. & O. R. R. stations in West Virginia

	Prop.	Pres.		Prop.	Pres.
Silverton	90	80	Evans	100	90
Crow Summit	100	90	Ripley	100	90
New Era	100	90	Johnsons (Wood Co.)	80	....
Sandyville	100	90			
Meadowdale	100	90	Hallen	80	70
Duncan	100	90	Creels	80	....
Leroy	100	90	Dewey	80	....
Liverpool	100	90	Placid	80	....
Seaman	100	90	Base Sta.	80	....
Dukes	100	90	Cool Spring	80	....
Reedy	100	90	Leachtown	80	....
Billings	110	100	Slate	80	70
Barrs	110	100	Hughes River	80	....
Nancy's Run	110	100	Carpenter and Lauderbaugh	80	....
Spencer	110	100			
Cottageville	100	90	Newark	80	70
Angerona	100	90			

26385. To establish on **sand and gravel**, carloads (See Note 3), from Dundee, Ind., to Anthony, Ind., rate of 75c per net ton. Route—Via N. Y. C. & St. L. R. R., Muncie, Ind., P. R. R. Present rate, 12c.

23693. To establish on **crushed stone**, carloads (See Note 1), from Pinehill, Mich., to Cleveland, O., rate of $3.36 per net ton. Route——Via Manistique, A. A. R. R., Toledo, and N. Y. C. R. R. Present rate, 43½.

23694. To establish on **sand and gravel**, carloads (See Note 3), from Rittenours, O., to Clarington, W. Va., rate of $1.40 per net ton. Present rate, $2.02 per net ton.

23697. To establish on **molding sand**, carloads (See Note 1), from Bear Creek, Ill., to Cambridge City, Ind., rate of $2.27 per ton. Present rate, $2.52 per ton.

23704. To establish on **silica sand**, carloads (See Note 3), from Summitville, Ind., to Fortville, Ind., rate of 90c per net ton, proposed rate to expire 30 days after effective date. Present rate, 11½c.

23708. To stablish on **sand (all kinds) and gravel**, carloads (See Note 3), from Warwick, O., to Cleveland, O., rates as shown below. Present and proposed rates (rates in cents per 2000 lb.):

Open Cars		Boxed Cars	
Proposed	Present	Proposed	Present
70	*80 †90	81	*92 †104

*Applies only on common sand and gravel.
†Applies only on high grade sand.

23709. To establish on **crushed stone**, carloads (See Note 3), from Thrifton, O., to Valley Crossing, O., rate of 90c per net ton. Present rate, 13c.

23716. To cancel 80% of sixth class rating on **ground or pulverized limestone**, carloads, from origin points in C. F. A. territory to destinations in Canadian Freight Association territory, applying classification basis in lieu thereof.

TRUNK LINE ASSOCIATION DOCKET

M-1332. **Sand, common or building** (not blast, engine, fire, foundry, glass, molding or silica) **and gravel**, carloads (See Note 2), from Clarence, N. Y., to Attica, N. Y., 75c per net ton. (Present rate, 83c per net ton.) Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

M-1333. **Limestone**, carloads (See Note 2), from Denver, Myerstown, Annville, Swatora, Brownstone, Hummelstown and Palmyra, Penn., to New Village, N. J., $1.40 per gross ton. (Present rate, $1.51 per gross ton.) Reason—Proposed rate is fairly comparable with rates to Vulcanite, Phillipsburg, N. J., Parryville, Bath, Martins Creek, Penn., etc.

M-1337. To cancel commodity rates on **limestone, crude, crushed and ground**, carloads, from the ports of New York, Philadelphia, Baltimore and Hampton Roads to all points in Trunk Line territory. Class rates to apply.

22579. **Crushed stone**, carloads (See Note 2),

from Northampton, Penn., to Weissport, Penn., 70c per net ton. Present rate, 75c per net ton. Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

22580. **Sand, viz., glass, engine, molding, ground, flint, quartz and silex,** in straight or mixed carloads (See Note 2), from Mapleton District, Penn., to Verona, Penn., $1.95 per ton. Present rate, $2.10 per net ton. Reason—Proposed rate is comparable with rates to Pittsburgh, Butler, Penn., etc.

22587. **Stone, crushed or quarry broken,** carloads (See Note 2), from Oriskany Falls, Solsville, Munns and Sherburne Four Corners, N. Y., to N. Y. O. & W. Ry. stations, Forest City to Scranton, Penn. Rates ranging from $1.20 to $1.30 per net ton. Rates to expire June 30, 1930. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

22598. **Ground limestone,** carloads, minimum weight 50,000 lb., from Blakeslee, N. Y., to East Branch, N. Y., $2.10 per net ton. Present rate, $2.40 per net ton. Reason—Proposed rate is comparable with rate to Cadosia and De Lancey, N. Y.

22601. (A) **Sand, building,** carloads; (B) **sand, blast, engine, foundry, molding, glass, silica, quartz or silex,** carloads (See Note 2), from Mapleton District, Penn., to Schenectady and Solvay, N. Y. (A) $2.70 and (B) $3.10 per net ton. Reason—Proposed rate is comparable with rates on like commodities from Mt. Holly, Hainesport and Cape May, N. J., to Solvay, N. Y., and from Mapleton District, Penn., to Rochester, N. Y.

22603. **Sand** (other than blast, engine, foundry, glass, molding and silica) **and gravel,** carloads (See Note 2), to East Waverly, N. Y., from Wysox, Towanda, Penn., 80c, and from La Grange, Wyoanna and Falls, Pa., $1.15 per net ton. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

22607. **Sand** (other than blast, engine, foundry, glass, molding and silica) **and gravel,** carloads (See Note 2), from Phillipsburg, N. J., to Kutztown, $1.40, and Lenhartsville, Penn., $1.50 per net ton. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

22615. **Limestone,** straight or mixed carloads, minimum weight 30,000 lb., from Leesburg, Va., to points on the B. & O. R. R., as follows:

Washington Branch—Hyattsville, Md., Brentwood, Md., Langdon, D. C.

Georgtown Branch—Chevy Chase, Md., Bethesda, Md., Georgetown, D. C.

Metropolitan Branch—University, D. C., Terra Cotta, D. C., Chillum, D. C., Lamond, D. C., Takoma Park, D. C., North Takoma, Md., Silver Spring, Md., Linden, Md., Forest Glen, Md., Kensington, Md., Garrett Park, Md.

$1.90 per net ton.

Reason—Proposed rates are comparable with rates from Riverton, Va.

22638. **Crushed stone,** carloads (See Note 2), from Honey Creek, Shraders and Naginey, Penn., to Mt. Carmel and Lewisburg, Penn., $1.25 per net ton. Present rate, $1.40 per net ton. Reason—Proposed rate is comparable with rates on like commodities for like distances, service and conditions.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

18644. **Common sand and run of bank, gravel,** minimum weight 50 net tons, from Gleasondale (Terminal Division) to Belmont, Boston, Cambridge, Somerville, Waltham, Waverley and West Cambridge, Mass. Present rate, 70c per net ton; proposed, 50c per net ton. Reason—To meet motor truck competition.

18734. **Crushed stone (trap rock)** (See Note 3), from Westfield, Mass., to Baldwinville, Mass. Present rate, $1.10 per net ton; proposed, $1 per net ton. Reason—The proposed rate is same as applied for similar distance by competing carriers for single line haul.

WESTERN TRUNK LINE DOCKET

7129. **Rock, crushed asphalt,** carloads, from Deerfield, Eldorado Springs and Nevada, Mo., to points in Missouri on lines other than the A. T. & S. F., C. R. I. & P., and Wabash. Present rates, class D; proposed, establish rates on basis of 10c per net ton higher than the crushed stone rates.

4264-C. **Sand and gravel,** carloads (See Note 2), except that when weight of shipment when loaded to full visible capacity of car is less than 90% of marked capacity of car the actual weight will apply, but in no case will the minimum carload weight be less than 40,000 lb., from Wheeler Pit, S. D., to Worthington, Minn. Present rate, 4½c per 100 lb.; proposed, 4c per 100 lb.

2051MM. **Stone, broken, crushed or ground,** carloads (See Note 2), but not less than 40,000 lb., from stations in South Dakota (west of the Missouri river) to stations in Nebraska. Present—Various specific rates. Proposed—To publish for alternative application, with the rates now in effect, the distance scale as shown in C. & N. W. Ry., Tariff G. F. D. No. 16572B.

ILLINOIS FREIGHT ASSOCIATION DOCKET

5378. **Sand, silica,** carloads. Rates per net ton. From Brownstown, Wis., to (representative points):

Present—Indianapolis, Ind., Toledo, O., Detroit, Mich., class rates.

Proposed—Processed—Indianapolis, Ind., $2.52; Toledo, O., $2.76; Detroit, Mich., $2.76. Crude—Indianapolis, Ind., $2.10; Toledo, O., $2.30; Detroit, Mich., $2.30.

From Muscatine, Ia., to (representative points):

Present—Processed—Indianapolis, Ind., $2.77; Toledo, O., $3.28; Detroit, Mich., $3.28. Crude—Indianapolis, Ind., $2.39.

Proposed—Processed—Indianapolis, Ind., $2.64; Toledo, O., $3; Detroit, Mich., $3.24. Crude—Indianapolis, Ind., $2.24; Toledo, O., $2.50; Detroit, Mich., $2.70.

5385. **Sand and gravel,** carloads, from Peoria, Ill., to Kewanee, Ill. Rates per net ton. Present, $1.01; proposed, 88c.

5393. **Limestone, crushed or ground,** in bulk or in sacks or barrels, carloads, minimum weight 60,000 lb., from Rosiclaire, Ill., to various I. C. R. R. points in Illinois. Rates in cents per net ton.

To	Pres.	Prop.
Chicago, Ill.	*	290
Peoria, Ill.	*	270
Springfield, Ill.	*	250
Bloomington, Ill.	*	260
Decatur, Ill.	*	250
Mattoon, Ill.	*	250
Neoga, Ill.	*	250
Effingham, Ill.	*	240
Pana, Ill.	*	200
Centralia, Ill.	*	200
St. Louis, Mo.	*	200

*Class rates.

5398. **Crushed stone,** as provided in Illinois Freight Classification No. 14, I. C. C. 19, Ill. C. C. 51, from East St. Louis, Ill., to Springfield, Ill. (B. & O. R. R. [west] delivery). Present rate, $1.13 per net ton; proposed, classification basis.

5399. **Sand and gravel,** carloads (See Note 3), from Conkeys Pit and Moronts, Ill., to various C. B. & Q. R. R. stations:

To (representative points)	Pres.	Prop.
Streator, Ill.	*	$1.00
La Salle, Ill.	*	.90
Leonore, Ill.	*	.90

*Class rates.

5402. **Crushed stone,** carloads, usual minimum weight, from McCook and Hodgkins, Ill., to various points on the C. & I. M. R. R. Rates per net ton:

To (representative points)	Pres.	Prop.
Peoria, Ill.	$1.51	$1.39
Springfield, Ill.	1.51	1.39
Taylorville, Ill.	1.39	1.39

5408. **Sand, gravel, sand and gravel pit strippings,** carloads, usual minimum, from Brownstown, Wis., to Davenport and Bettendorf, Ia. Rates per net ton:

	Pres.	Prop.
On common sand and gravel	$1.70	$1.30
On other than common sand	2.00	1.30

4257, Sub. 2—**Sand, core,** carloads, from Greenwich, Kankakee, Van's Siding and West Kankakee, Ill., to Peoria, Ill. Rates per net ton. Present, $1.76; proposed, $1.10.

4392, Sub. 4—**Ground limestone,** carloads, minimum weight 40,000 lb., from Quincy, Ill., to Calloway, Ill. Rates per net ton. Present, $2.80; proposed, $1.50.

5417. **Sand,** carloads, all kinds, from Browntown, Wis., to Waukegan, Ill. Rates per net ton. Present, $1.50; proposed, $1.30.

5424. **Sand and gravel** (except molding and silica), carloads, from Ottawa, Ill., to Spencers, Aladdin, Shepperds and East Hannibal, Ill. Rates per net ton. Present, $2.40; proposed, $1.39.

5429. **Crushed stone, gravel** (other than bank, glass, molding and silica sand); **crushed refuse gravel; crushed concrete gravel; sand and gravel pit strippings; cinders and crushed and broken slag,** carloads, from Janesville and Beloit, Wis., to Elgin, Ill., also from Janesville, Wis., to McQueen and Davis Jct., Ill.

SOUTHERN FREIGHT ASSOCIATION DOCKET

48577. **Sand,** from Garysburg, N. C., to Sunbury, N. C. Present rate, 151c per net ton (combination). Proposed through rate on **sand** (other than molding) **and gravel,** carloads (See Note 3), from Garysburg, N. C., to Sunbury, N. C., 130c per net ton.

48599. **Sand, gravel, stone, slag and chert,** from Birmingham, Ala., district points to stations on the L. & A. Ry. It is proposed to meet the rates of the Y. & M. V. R. R. on sand, gravel, stone, slag and chert, carloads, as now provided in Agent Glenn's I. C. C. A-655, from Bessemer, Birmingham, Boyles, Calera, Dolcito, Dolcito Jct., East Birmingham, Ensley, Gate City, North Birmingham, Oxmoor, Pratt City, Thomas and Woodward, Ala., at competitive points on the L. & A. Ry., east of the Mississippi river, and observe these rates at intermediate points.

48624. **Phosphate rock** from points in Alabama and Tennessee to Hollandale, Minn. It is proposed to amend L. & N. R. R. I. C. C. A15803 (G. F. O. 44C), applying on phosphate rock, carloads, as described therein, by providing same rates to Hollandale, Minn., as currently in effect to Owatonna, Minn.

48671. **Stone, crushed or rubble,** from Kenbridge, Va., to Richmond, Va. Present rate, 280c per net ton. Proposed rate on stone, crushed or rubble, in straight or mixed carloads (See Note 3), from Kenbridge, Va., to Richmond, Va., 105c per net ton, based on joint line scale prescribed in I. C. C. Docket 17517, for 77 miles short line distance via Alberta, Va.

SOUTHWESTERN FREIGHT BUREAU DOCKET

19177. **Phosphate rock,** from Mobile, Ala., to Little Rock, Ark. To establish a rate of 24½c per 100 lb. (rate to apply only on import and coastwise traffic and to apply only from shipside), on **phosphate rock,** carloads, description and minimum weight as per Item No. 3050 of S. W. L. Tariff No. 82F, from Mobile, Ala., to Little Rock, Ark. It is desired to establish the same rate from Mobile, Ala., as currently applicable from New Orleans, La.

Georgia Intrastate Rates Found Prejudicial to Alabama Producers

THE Interstate Commerce Commission has announced an important decision covering rates on chert, sand and gravel within the state of Georgia, the synopsis in two cases being as follows:

1. Upon further hearing in No. 17517, rates maintained by respondents on sand, gravel, crushed stone and allied commodities, in carloads, for application within Georgia, found to be unduly prejudicial to interstate shippers, discriminatory against interstate commerce.

2. Upon further hearing in No. 17763, undue prejudice to complainant at Montgomery, Ala., and undue preference of shippers between points in Georgia, found to result from the relation of interstate rates on sand and gravel, in straight or mixed carloads from Montgomery to destinations in Georgia, and interstate rates on sand, gravel and crushed stone, in carloads, from points in Georgia to the same destinations.

The complaint of the Montgomery gravel producers alleged that the rates made by the state authorities of Georgia on sand, gravel, stone, etc., were unduly prejudicial to the Montgomery shippers in that they were lower, distance considered, than the rates from Montgomery to points throughout the state of Georgia.

Georgia has been a large consuming market for sand and gravel produced at Montgomery and Montgomery has been handicapped heretofore in meeting competition within Georgia on account of the Georgia shippers enjoying preferential state-made rates, it was charged.

The new adjustment is to be made effective within the near future.—*Montgomery (Ala.) Advertiser.*

I. C. C. Proposed Reports

Sand and Gravel. Examiner W. H. Smith in No. 20526, North Shore Material Co. vs. C. & N. W. et al., proposes dismissal. Rates from Liberty Lake, Ill., to Racine, Wis., not unreasonable or unlawful.

Moline Consumers to Build Cordova Plant

MOLINE Consumers Co. is to build a $25,000 washing plant near Cordova, Ill., according to recent announcement in the *Davenport (Iowa) Times*. The company has been working the sand and gravel deposits near that place for over a year, the dredged material being hauled by barge to a sizing plant at Moline. The new plant is to have a capacity of 2000 tons per day and will ship into Moline.

Quarry Property Sold at Auction

PUBLIC sale of an 8-acre tract of land and quarry, together with all materials and implements, was held recently at Sinking Springs, Penn. The property was offered as the estate of Charles W. Freeman, deceased. Three trucks, a quantity of sand, lime and other materials were included in the purchase. The property was started at $5000 and was bid up rapidly, the final figure being $13,425, at which price it was sold to Miller Bros. of Sinking Springs. The purchasers will continue the business.—*Reading (Penn.) Eagle.*

Slate Industry Conference

THE slate industry will hold its annual conference under the auspices of the National Slate Association at the Hotel Commodore, New York City, on January 20, 21 and 22, 1930. Several hundred delegates will attend from all sections of the country, including slate quarry and mill executives, slate products distributors, and slate roofing and setting contractors. There will be also representatives of the Hosts Club, the concerns furnishing the slate industry equipment and supplies.

The sessions will cover separate group meetings on Monday and Tuesday, on problems of various branches of the industry. The theme of the general meetings of the entire industry, starting at 2:30 Tuesday afternoon, January 21, is "Improving Trade Relations." Trade practices in the industry and relations between the various groups will be considered with a view to co-ordinating the efforts of all for most effective promotion of all slate products.

On January 21, 6 P. M., will be held the annual dinner and theater party, with the usual splendid entertainment. On January 22, a joint meeting will be held of the slate quarry and mill executives, the slate trade and the members of the Hosts Club with Committee D-16 on slate of the American Society for Testing Materials, William B. Plank of Lafayette College presiding. This very important session will be devoted to discussions on progress of new equipment and production methods during the past year and plans for 1930 research and tests work will come in for consideration.

Several sessions of the setting contractors will be devoted to possible simplification of fireplace openings. The conference will close with the Hosts Club luncheon, when the executives in the slate quarries and mills and the trade will be entertained at luncheon by the concerns furnishing their equipment and supplies.

Easier Money in 1930 Expected to Improve Cement Industry

EASIER money rates expected during 1930 as a result of the decline in stock prices should encourage building construction as well as federal, state and municipal improvements, thus materially aiding the cement industry, according to the *Fortnightly Review* of G. M.-P. Murphy and Co. It points out that more than 50% of the cement used in this country is for roads, streets and buildings and that in a year like 1929 when financing such projects was difficult consumption inevitably fell off.

"The largest single use of cement is in the construction of roads and streets which has been increasing rapidly during recent years," continues the *Review*. "In 1921, it was estimated that about 23,000,000 bbl. were used for this purpose, in 1926, 45,000,000, and in 1928, about 57,000,000. Certainly there seems no reason to doubt that public demand for additional mileage of improved highways will continue and that the long-time trend of cement consumption is upward."

At present, says the *Review*, production capacity of the industry is considerably greater than consumption, which makes for uneconomical operation in some cases. It explains, however, that two factors makes a certain amount of extra capacity necessary: (1) the seasonal demands for cement and (2) high freight charges when the plant is far from consumer which has caused many plants to be opened nearer consumption, even though others are operating below capacity elsewhere.

In further explanation of this second factor, it points to the increase in production in the Southeast, Middle West and Pacific coast to meet local demands arising in those areas, their production capacities rising 250%, 140% and 120% respectively since 1921, during which period total capacity of the industry increased 68%.

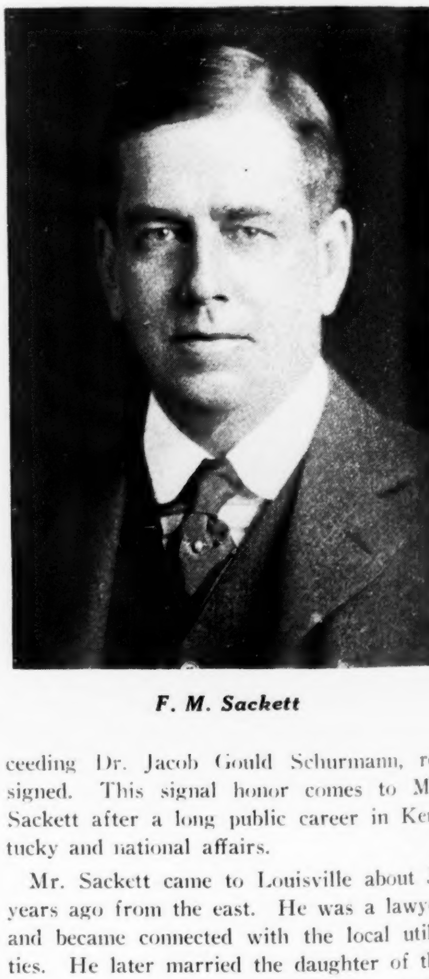
"The cement business," continues the *Review*, "is not one in which the investing public has participated very generally; the corporate form has tended rather to be one of smaller units comparatively closely owned. There is some indication, however, that the pressure of conditions in the industry is gradually changing this. The earnings record of International Cement Corp. would seem to point to the logic of combinations of plants geographically diversified so that the corporation will not be dependent on conditions in a single market."

Standard Lime Operating Calera Plant

SEVERAL improvements have been made at the Calera, Ala., plant of the Standard Lime Co., Birmingham. This plant, recently purchased from the Calera Lime Works, is now operating three kilns, producing about 400 bbl. daily. A Sturtevant crusher has been installed for crushing lime and also several screens to remove the fines from the lump lime. Other equipment in place includes a Schulthess hydrator. The kilns will be converted to gas firing at an early date; natural gas from Louisiana will be used.

Senator F. M. Sackett Made Ambassador to Germany

FREDERICK M. Sackett, vice-president of the Louisville Cement Co., Louisville, Ky., and U. S. senator from Kentucky, has been named as ambassador to Germany, succeeding Dr. Jacob Gould Schurmann, resigned. This signal honor comes to Mr. Sackett after a long public career in Kentucky and national affairs.



F. M. Sackett

Mr. Sackett came to Louisville about 30 years ago from the east. He was a lawyer and became connected with the local utilities. He later married the daughter of the late J. B. Speed, and following consolidation of the power companies gave his attention to coal, lime, cement and the lines handled by the Speed interests. He had never held political appointment until he was elected to the U. S. Senate in 1924, although he had been a Republican leader in Kentucky.

Mr. Sackett has resigned from the Louisville company, H. D. Bayler succeeding him.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Merchandising Concrete Products—Then and Now

Part II—Cast Stone Co., St. Paul, Minn., Highly Successful in Selling Block for Above-Grade Construction Since 1920

By T. A. Day
Oak Park, Ill.

PROGRESSIVE concrete products manufacturers of today are making every effort to sell concrete masonry units for above-grade construction. They are not only striving and succeeding in the residential field, but they are achieving equally good results even in the skyscraper field. It is interesting, then, to note that back in 1920 one products manufacturer was placing 40% of his annual output of concrete block in above-grade construction. It will be well to let Harry G. Krum of the Cast Stone Co., St. Paul, Minn., tell the story:

Defied Experts' "Limitations"

"Before I became identified with the concrete products industry a few years ago," said Mr. Krum in 1921, "I consulted a number of architects, contractors and concrete products manufacturers relative to the value and demand for concrete units. The advice I received was unanimous; they were all agreed that the market was very limited, that the concrete unit was of little economic value and that its use was limited to foundations and small buildings. In analyzing their reasons for such a conclusion I was convinced that there were only two things that had prevented a more general use of concrete building units. One was the type and quality of the units sold, and the other was the way the units had been used, that is, the design or rather the lack of design of the buildings.

"I was of the opinion then, and I am more convinced now, that there is, and will be, a large place in the construction field for properly made and appropriately used concrete units, and that such units have greater economic value above-grade than they have below-grade.

"High quality concrete units will carry greater loads in proportion to their weight and are more fire-resistive than other forms of masonry construction. They can be produced and sold at a cost that compares favorably with less serviceable material. Such units in the form of blocks can be laid in the wall at a great saving in labor and mortar over other masonry materials."

Experience both from building operations and from extensive research work conducted in reliable laboratories is represented in the concrete masonry units used today. Now, as Mr. Krum predicted in the preceding paragraph, the great strength of concrete masonry construction, its high resistance to fire and its exceptional economy are all established facts.

"Concrete units should be divided into two classes," said Mr. Krum in 1921.

"First, for ordinary wall construction where the surface is unexposed to view or is to be covered by stucco or veneer for architectural effects. Second, for exposed wall construction, including standard and special sized units and trimstone.

"Concrete units of the first class should be strong, dense, uniform in size and shape, but they do not need any special surface treatment. Such units furnish the best and most economical material for the purpose stated above.

A garage in Brownton, Minn., built in 1920 of concrete block furnished by the Cast Stone Co., St. Paul

"Concrete units of the second class should be faced, or the face should receive a mechanical or chemical treatment to expose the aggregate. In manufacting such units, no one should overlook the fact that they are essentially a stone unit. Therefore, they should be incorporated into buildings in the same general way as natural stone and

should be made up in sizes having correct proportion for such designs.

"I believe that any plant manufacturing concrete units in accord with the above ideas will have a rapidly growing demand for its material. If the product is a unit that is right from an engineering standpoint, and one that is correct architecturally, there should be little difficulty in securing recognition of its value from the architect and builder. We must again emphasize the importance of quality. The economic value of concrete building units depends entirely on the quality of concrete in them. Poor concrete is neither strong nor fire-resistant nor good to look at.

"Of course, even quality products will not sell themselves. It takes salesmanship to convince the architect and builder that you are making the kind of a unit they can depend on and use. And it generally means that you must co-operate with them in selling the owner.

"The matter of design is almost as important as that of quality. The products manufacturer should insist on the services of a competent architect so that buildings into which his material goes are designed with due regard to the character of the material and the uses of the buildings. If necessary, he can well afford to pay the architect's fees himself.

"Before the war 90% of our product was used for foundations. After the war was over we adopted the policy as outlined above. That it is workable may be judged from the fact that in 1920 approximately 40% of our product was used for above-ground construction."

It is almost needless to say that the advice concerning concrete block in above-grade construction, as given by Mr. Krum in 1921, is also worthy of consideration by present-day concrete products manufacturers. This is also true of recommendations with reference to advertising and service given by Clarence V. Bertsch in ROCK PRODUCTS, December 7, 1929.

(To be concluded)

Patent Issued for Concrete Products Made from Shells

A PATENT for a concrete composition formed of oyster shells and cement and for the process of making such a composition was granted by the U. S. Patent Office on the application of Harry F. Adams.

An opinion of the board of appeals, just announced, states that the claimed invention is not anticipated by a British patent for a concrete composition formed by mixing crushed shells, cement and water.

According to an affidavit filed by the applicant, the opinion states "he has found that where oyster shells were not thoroughly washed after being crushed, other conditions being the same, he was unable to secure a suitable hard, durable concrete, and that when the oyster shells were crushed and then washed he was able to obtain a product which is light, hard and durable and which can be sawed and nailed."—*U. S. Daily.*

To Establish Concrete Pipe Plant at Oakland, Calif.

UNITED STATES Concrete Pipe Corp., operating plants at Modesto, Fresno, Turlock and Tracy, Calif., is reported to have purchased the concrete pipe plant of the Oakdale Irrigation District, a municipal enterprise. In the sale of the equipment to the United States Concrete Pipe Corp. the district gets an agreement by which it will purchase concrete pipe for its own use at practically the cost of production, although this reduction will not apply to other users in the district. The company recently purchased the plant of the Turlock Irrigation District.

Decision to sell the Oakdale plant to a private corporation was made after an auditing showed the district that it was losing money on the project.—*Fresno* (Calif.) *Republican.*

Idaho Portland to Build Cement Products Plant

THE city of Pocatello, Idaho, will agree to lease to E. J. Simons, president of the Idaho-Portland Cement Co., a 25-acre tract of land situated at the south end of the municipal airport ground, to be used as a site for a cement products manufacturing plant, for a period of 50 years, according to action taken at a recent meeting of the city council.

Mr. Simons proposes to erect a plant costing approximately $80,000 on the premises, which will furnish work to from 50 to 75 men. Cement for manufacturing purposes will be furnished by the mill of the Idaho-Portland Cement Co. at Inkom.—*Pocatello* (Idaho) *Tribune.*

Concrete Stave Silo Manufacturers Meet

APPROXIMATELY 50 manufacturers representing the concrete stave division of the National Silo Research Council attended a meeting arranged for them at the Portland Cement Association headquarters in Chicago recently. All of the larger manufacturers were represented. Talks were given by members of the Cement Products Bureau staff on merchandising and technical problems, including a review of silo coating experiments. The program was concluded by an inspection trip through the research laboratory. Following the talk on merchandising, the star silo salesman of one company related his personal experiences in making 133 sales during the past season. Manufacturers predict that 1930 will be an even better silo year than 1929, which was one of the biggest years in the silo business.

National Products Association to Meet in New Orleans

THE ANNUAL meeting of the National Concrete Products Association will be held at the Roosevelt Hotel, New Orleans, La., February 10, 1930. Several important sessions for products men have been announced at the American Concrete Institute meeting, also to be held in New Orleans, on February 11, 12 and 13.

New Artificial Travertine

MILAN will not import any more travertine stone for building purposes from Rome because it is too expensive, according to R. E. Forte, in a letter in the *Chicago* (Ill.) *News.* Travertine, a white concrete-like limestone, is abundant in the Latium region, especially at Tivoli, where it is quarried. Milanese masons have evolved an interesting method of making composition stone similar in appearance to the famous Roman product. They plaster the sides of wooden boxes with coarse salt, which are filled with slaked lime. As soon as the mixture becomes solid, water is thrown on it and the salt dissolves, leaving the block of stone dotted with small cavities, particularly noticeable in good travertine. Visitors often have an erroneous impression that all houses in Rome are crumbling because of the peculiarity in the stone. Good travertine is costly, unusually hard, semicrystalline and deposited from spring waters holding lime in solution. The old Romans used it on a large scale for their monuments and temples, the Colosseum itself being made of travertine.

Artistry in Slate

THE SPECIAL "color" number of the *Struco Slate Review* shows a number of interesting developments in the artistic use of slate. Pleasing color combinations, rich in tone, have been applied to slate flooring, wainscoting, walls and even to novelties such as book ends, clocks, checkerboards, to mention a few of the applications. The finish of "Struco," a trademarked slate product made by the Structural Slate Co., Pen Argyle, Penn., is made of a special nitrocellulose lacquer which gives a hard, protective and durable surface, obtainable in a variety of colors.

N. M. Stineman Becomes Editor of "Concrete"

NORMAN M. STINEMAN has been appointed editor of the publication *Concrete*, succeeding O. A. Steller, who resigned and is now advertising manager for McEverlast, Inc., Los Angeles, Calif. Mr. Stineman is well known in the concrete industry, having been for several years structural engineer of the Portland Cement Association, in charge of building work and related activity.

Wabash Portland Increases Quarry Holdings

WABASH Portland Cement Co., Osborn, Ohio, has purchased the farm and stone quarry of the Buckeye Steel Casting Co., located near old Osborn. The quarry has been operated by the Buckeye company for the past year.

Acquisition of the 150-acre properties increases the Wabash holdings to 1500 acres. All the machinery used by the Buckeye company in its former quarry is being dismantled by them into scrap.—*Osborn* (Ohio) *Herald.*

Wisconsin Granite Quarries Producing Breakwaters

THE GRANITE quarries in the Redgranite and Lohrville, Wis., district have been quite busy filling orders for breakwater stones to replace those damaged during the late violent storms on the Great Lakes. An average of 20 cars per day of breakwaters is being shipped by the four quarries, principally to Milwaukee. The market for paving stone has been poor, but is expected to revive after the Chicago traction agreement is completed some time in February.—*Berlin* (Wis.) *Journal.*

Ocala Lime Rock Completing New Crushing Plant

THE Ocala Lime Rock Corp., Ocala, is completing a plant about five miles east of Newberry, Fla., on the Atlantic Coast Line. Equipment for the new plant, which will have a capacity of approximately 2,000 tons of Florida lime rock per 10-hour day, is being brought from a dismantled plant near Kendrick and includes two ⅞-cu. yd. Erie steam shovels, a 24 x 60 roll crusher and two 60 hp. horizontal type Bessemer oil engines.—*New York Journal of Commerce.*

Northwestern Talc to Work Washington Deposits

NORTHWESTERN Talc Corp., Seattle, Wash., has been organized for the purpose of developing the talc deposits of the state of Washington. The corporation's holdings consist of five separate talc deposits in Skagit and Whatcom counties. The grinding mill will be erected in Seattle, to which raw talc will be shipped from the corporation's various properties.

It is contemplated by the corporation to enter into the manufacturing field to produce many products having talc as their base, which products have been perfected by the corporation's ceramic engineers; also to produce ground talc in bulk especially prepared to meet the requirements of the many industries utilizing this product in their operations. The company will also grind paint pigment rock, silica, ochre and other nonmetallic minerals, deposits of which are now under control of the corporation.

At the first meeting of the stockholders recently held the following directors were elected: Robert S. Donaldson, Dr. Wm. A. Glasgow, Walter M. Johnson, James Griffiths Stephens and Dan H. McGrath. Officers of the corporation were chosen as follows: President and general manager, Robert T. Donaldson; vice-president, Dr. Wm. A. Glasgow; secretary, Walter M. Johnson; treasurer, Dan H. McGrath. — *Seattle* (Wash.) *Alaska Weekly.*

Install Magnesite Products Plant in Montana

THE Montana Dialaid Co., manufacturer of a special magnesite cement composition that can be used for floor covering, drainboards, bathroom floor and wall finishing and dozens of other purposes, has established a plant at Great Falls, Mont., and will start actual operations soon, R. D. Merrill, owner and manager, announced.

While the building at the above address will be used temporarily for manufacturing purposes, Mr. Merrill states that a new plant will be erected on trackage as soon as the business warrants an enlargement.

Materials used in this product for the most part come from Germany, while the silica sand will be furnished by the Anaconda Copper Mining Co.'s local plant. Chemicals used in the process include magnesium chloride, kciselguhr, magnesite and talc.—*Great Falls* (Mont.) *Tribune.*

Keystone Sand Adds 10 New Sand and Gravel Barges

KEYSTONE SAND and Supply Co., Pittsburgh, Penn., has awarded contract to the Dravo Contracting Co. for the construction of 10 standard size sand and gravel barges of the deck type for service on the three rivers in the Pittsburgh district.—*Pittsburgh* (Penn.) *Post.*

A Reader's Suggestion

EDITOR—I would like to see a joint committee appointed from all the rock products industries, by the several associations and perhaps some representatives from each association to collect data regarding employers' liability insurance; not only so far as it refers to the rock products business, but to make comparisons between rock products liability insurance rates and rates paid in the brick industry, coal, mining, etc. I believe there is a great opportunity to have the rock products industry rate cut materially.

W. J. GARRISON,
Manager, Silicon Products Co.
Ridgway, Penn.

Salem Company Planning for Mineral Wool Plant

RECENT tests have shown that stone of quality suitable for processing into mineral wool is to be found in large quantities on the land owned and operated by the Salem Lime and Stone Co., one mile west of Salem, Ind.

It has been known for some time that there was an abundance of this stone here but it had not been tested for quality until a short time ago, when Wm. Cassidy, the superintendent, constructed a miniature cupola, melted the stone, and with the aid of compressed air, produced some of the finished product.

The Salem Lime and Stone Co. which was organized a few years ago by local people, manufactures lump and hydrated lime and crushed stone.

The capital stock was recently increased from $30,000 to $100,000. It is the intention to sell additional stock to secure funds to equip a plant in which to manufacture mineral wool.—*Salem* (Ind.) *Democrat.*

L. H. Stewart New President of Retarder Company

AT A RECENT meeting of the board of directors of the National Retarder Co., Chicago, Ill., L. H. Stewart was elected president and general manager of the company, succeeding A. H. Gallagher, who had directed the company's affairs for many years. Mr. Stewart is an engineer with many years' experience in the manufacturing of gypsum retarder, having been plant superintendent for the National Retarder Co. for the past five years at the McCook, Ill., plant. Mr. Stewart recently left on an extended trip throughout the Southwest and Pacific coast and expects to visit the gypsum companies in those localities to familiarize himself with the gypsum producers' problems in so far as they are related to the use of retarder.

Bessemer Cement Making Mill Improvements

BESSEMER Cement Corp. is now engaged in several important additions to its Bessemer, Penn., plant. A packhouse, two storage silos, each 78 ft. high by 34 ft. dia., and two blending silos, 38 ft. 6 in. high by 35 ft. dia., are under construction by the M. A. Long Co., Baltimore, Md., for the Bessemer company.

Erratum

IN THE January 4 issue, on page 110 relating to "Gypsum in 1929," the end of the first paragraph, through a typographical error, reads, "The blasting is done with 20% dynamite and 'Clover' fuse and no caps." This line should read, "The blasting is done with 20% dynamite, 'Clover' fuse and caps."

The Rock Products Market

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Asbury Park, Farmingdale, Spring Lake and Wayside, N. J.	.48	.48	1.15	1.25	1.40	....
Attica and Franklinville, N. Y.	.75	.75	.75	.75	.75	.75
Boston, Mass.‡	1.25	1.15	1.75	....	1.75	1.75
Buffalo, N. Y.	1.00	1.05	1.05	1.05	1.05	....
Erie, Penn.	.70	1.00	1.50	1.50	....	....
Milton, N. H.	....	....	1.75	....	1.25	1.00
Montoursville, Penn.	1.00	.70	.50	.50	.50	.50
South Portland, Me.	....	1.00	2.25	....	....	2.00
Washington, D. C.	.55	.55	1.20	1.20	1.00–1.20	1.00
CENTRAL:						
Appleton, Minn.	....	.50	1.25	....	1.50	....
Attica, Ind.	All sizes .75–.85					
Barton, Wis.	....	.40d	.50d	.60d	.60d	.60d
Beloit, Wis. (f)	.60	.30	.30	.40	.40	.40
Des Moines, Iowa	.60	.80	1.70	1.70	1.70	1.70
Dresden, Ohio	....	.60– .70	....	.70– .80	.70– .80	....
Eau Claire, Wis.	.55	.55	.70	1.00	1.00	....
Elkhart Lake and Glenbeulah, Wis.	.50	.50	.60	.60	.60	.60
Grand Rapids, Mich.	.50	.50	.80	.80	.80	.70
Hamilton, Ohio	.90-1.20	.90–1.20	.90–1.20	.90..1.20	.90–1.20	.90–1.20
Hersey, Mich.	....	.50	....	.50	.70	.70
Humboldt, Iowa	.40	.40	1.25	1.25	1.25	1.25
Indianapolis, Ind.	.50– .75	.40– .60	.50– .75	.50– .75	.60– .85	.60– .85
Kansas City, Mo.	.70	.70	....	....	....	....
Mankato, Minn. (b)	.55	.45	1.25	1.25	1.25	....
Mason City, Iowa	....	.40– .50	1.25	1.25	1.00–1.20	1.00–1.20
Milwaukee, Wis.	.91	.91	1.06	1.06	1.06	1.06
Minneapolis, Minn. (a)	.35	.35	1.35	1.35	1.35	1.25
St. Paul, Minn. (e)	.35	.35	1.25	1.25	1.25	1.25
Terre Haute, Ind.	.75	.60	.75	.75	.75	.75
Waukesha, Wis.	....	.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	.50	1.10	1.00	1.00
SOUTHERN:						
Brewster, Fla.	.40	.40	....	....	....	....
Charleston, W. Va.	.70	1.25	1.25	....	....	....
Eustis, Fla.	....	.40– .50	....	....	....	....
Fort Worth, Texas	.75– .90	.75– .90	1.00–1.10	1.00–1.10	1.10–1.25	1.10–1.25
Knoxville, Tenn.	.70–1.00	1.20	....	....	1.20	1.20
Roseland, La.	.30	.30	.80	.80	.80	....
WESTERN:						
Los Angeles, Calif.	.10– .40	.10– .40	.20– .90	.50– .90	.50– .90	.50– .90
Oregon City, Ore.	All grades range from 1.00 to 1.50 per cu. yd.					
Phoenix, Ariz. (c)	1.25*	1.15*	1.50*	1.15*	1.15*	1.00*
Pueblo, Colo.	.70	.60	....	1.25	....	1.15
Seattle, Wash.	1.00*	1.00*	1.00*	1.00*	1.10*	1.25*

*Cubic yd. ‡Delivered on job by truck. (a) Per yd., delivered by truck, ¼-in. down, 1.25; 2-in. and less, 2.40. (b) ¼- to ¾-in., 1.25. (c) 60-70% crusher boulders. (d) Plus 15c for winter loading. (e) Prices f.o.b. cars N. P. Ry. (f) Algonquin, Ill., district 5c per ton higher.

Core and Foundry Sands

Silica sand quoted washed, dried, screened unless otherwise stated; per ton f.o.b. plant.

City or shipping point	Molding, fine	Molding, coarse	Molding brass	Core	Furnace lining	Sand blast	Stone sawing
Albany, N. Y.	2.75	2.75	2.75	....	....	3.75	....
Cheshire, Mass.	Sand for soap, 7.00–8.00					6.00–8.00	
Dresden, Ohio	1.50–1.75	1.25–1.50	1.50	....	1.50	....	....
Eau Claire, Wis.	....	....	....	....	....	2.50–3.00	....
Elco, Ill.	Soft amorphous silica, 92%-99% thru 325 mesh, 18.00–40.00 per ton						
Franklin, Penn.	1.75	1.75	....	....	....	....	....
Kasota, Minn.	....	....	....	....	....	....	1.00
Montoursville, Penn.	....	....	....	1.35–1.50	....	....	....
New Lexington, Ohio	2.25	2.00	....	....	....	....	....
Ohlton, Ohio	1.75	1.75	....	2.00	1.75	1.75	....
Ottawa, Ill.	1.25–3.25	2.25	1.25–3.25	1.25–3.25	1.25	3.50	3.50
Red Wing, Minn. (a)	....	....	....	....	1.50	3.00	1.50
San Francisco, Calif.	3.50†	5.00†	3.50†	2.50–3.50†	5.00†	3.50–5.00†	....
Silica, Mendota, Va.	Potters' flint, 8.00–14.00						

†Fresh water washed, steam dried. (a) Filter sand, 3.00.

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio	....	1.50
Eau Claire, Wis.	4.30	1.00
Franklin, Penn.	....	1.75
Ohlton, Ohio	1.75	1.75
Ottawa, Ill.	1.25–3.25	1.25
Red Wing, Minn.	....	1.00
San Francisco, Calif.	3.50	3.50
Silica, Va.	....	1.75

Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. plant.

Cheshire, Mass., in carload lots	5.00–7.00
Franklin, Penn.	2.25
Klondike, Mo.	2.00
Ohlton, Ohio	2.50
Ottawa, Ill.	1.25
Red Wing, Minn.	1.50
San Francisco, Calif.	4.00–5.00
Silica and Mendota, Va.	2.50–3.00

Bank Run Sand and Gravel

Prices given are per ton, f.o.b. producing plant or nearest shipping point.

Appleton, Minn.†	.55
Beloit, Wis.¶ (½-in. and less)	.40
Brewster, Fla.†	.40
Burnside, Conn.†	.75*
Chicago, Ill.†	.92–1.20
Des Moines, Ia. (sand and gravel mix)	1.00–1.05
Fort Worth, Tex.¶ (2-in. and less)	.60– .75
Gainesville, Tex.¶ (1½-in. and less)	.55
Gary and Miller, Ind.†	1.15–1.40a
Grand Rapids, Mich.¶ (1-in. and less)	.55
Hamilton, Ohio¶ (1½-in. and less)	.50–1.00
Hersey, Mich.¶ (1-in. and less)	.50
Mankato, Minn.†	.70
Pueblo, Colo.—†River run sand	.50
Seattle, Wash.—Sand, 1/10-in. down, .25*; ¼-in. and less, same; gravel in sizes ranging from 2-in. and less to ½-in. and less	.25*
Winona, Minn.†	.60
York, Penn. Sand, ¼-in. and less, 1.00; 1/10-in. down	1.10

*Cubic yard. †Fine sand, 1/-10-in. down. (a) Cu. yd., delivered Chicago. ¶Gravel.

Current Price Quotations

ROCK PRODUCTS solicits volunteers to furnish accurate price quotations.

Portland Cement

	Per Bag	Per Bbl.	High Early Strength
Albuquerque, N. M.	.91¼	‡3.15	4.30¶
Atlanta, Ga. (1) (2)	....	2.59	*3.49¶
Baltimore, Md. (1)	....	2.65	3.56¶
Berkeley, Calif.	....	‡2.24	......
Birm., Ala. (1) (2)	....	2.25	*3.15¶
Boston, Mass. (1)	‡.57	‡2.28	3.27¶
Buffalo, N.Y. (1)	‡.61¼	‡2.45	3.35¶
Butte, Mont.	.90¼	3.61	......
Cedar Rapids, Ia.	....	2.04	2.99f
Centerville, Calif.	....	‡2.24	......
Charleston, S. C. (2)	....	2.69b	*3.26¶
Cheyenne, Wyo. (1) (2)	.71½	2.86	......
Chicago, Ill.	....	1.85	3.15¶
Cincinnati, Ohio	....	1.92	3.22¶
Cleveland, Ohio	....	1.94	3.24¶
Columbus, Ohio	....	1.92	3.22¶
Dallas, Texas	....	1.65	3.14¶
Davenport, Iowa	....	2.04	......
Dayton, Ohio (1)	....	‡2.34	3.24¶
Denver, Colo.	.63¾	2.55	......
Des Moines, Iowa	.48½	1.94	2.99f
Detroit, Mich.	....	1.95	3.25¶
Duluth, Minn.	....	1.94	......
Fresno, Calif.	....	‡2.43	......
Houston, Texas	....	1.75	3.38¶
Indianapolis, Ind.	.54¾	1.69–1.89	f2.44–3.19¶
Jackson, Miss. (1) (2)	....	2.69	*3.59¶
Jacksonv'le, Fla. (2)	....	2.74c	*3.26¶
Jersey City, N.J. (1)	....	2.53	3.43¶
Kansas City, Mo.	.45½	1.82	f2.87–2.97¶
Los Angeles, Calif.	.37½	1.50	......
Louisville, Ky.	.55½	‡2.01	f2.92–3.31¶
Memphis, T'n. (1) (2)	....	2.65	f2.74–*3.55¶
Merced, Calif.	....	‡2.11	......
Milwaukee, Wis.	....	2.00	3.30
Minneapolis, Minn.	....	2.02	......
Montreal, Que.	....	1.60	......
New Orleans, La.	.43	‡1.92	3.22¶
New York (1)	‡.60¾	‡2.43	3.33¶
Norfolk, Va. (1)	....	†2.37	3.27¶
Oklahoma City, Okla.	.54	2.16	3.31¶
Omaha, Neb.	.50¼	2.01	3.16¶
Peoria, Ill.	....	2.02	3.32¶
Pittsburgh, Pa. (1)	....	2.25	3.35¶
Philadelphia, Pa. (1)	....	2.55	3.45¶
Phoenix, Ariz.	....	3.51	......
Portland, Ore.	....	2.30–2.40	......
Reno, Nev. (2)	....	2.86	......
Richmond, Va. (1)	....	†2.66	3.56¶
Sacramento, Calif.	....	‡2.35	......
Salt Lake City, Utah	.70¼	2.81	......
San Antonio, Texas	....	......	3.42¶
San Francisco, Calif.	....	2.14	......
Santa Cruz, Calif.	....	‡2.20	......
Savannah, Ga. (2)	....	2.69a	*3.16¶
St. Louis, Mo.	.48¾	1.50–1.70	f2.65–3.00¶
St. Paul, Minn.	....	2.02	......
Seattle, Wash.	....	†2.50	f3.70
Tampa, Fla. (1) (2)	....	2.40	*3.41¶
Toledo, Ohio	....	2.03	3.33¶
Topeka, Kan.	.50¼	2.01	3.16¶
Tulsa, Okla.	.50¾	2.03	3.18¶
Wheeling, W.Va. (1)	....	2.32	3.42
Winston-Salem, N. C. (1)	....	†2.64	3.54¶

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.	High Early Strength
Albany, N. Y.	....	2.15	......
Bellingham, Wash.	....	2.35†	......
Buffington, Ind.	....	1.60	......
Chattanooga, Tenn.	....	2.05	......
Concrete, Wash.	....	2.35	......
Davenport, Calif.	....	2.05	......
Hannibal, Mo.	....	1.90	......
Hudson, N. Y.	....	1.75	......
Leeds, Ala.	....	1.65	......
Lime & Oswego, Ore.	....	2.40	......
Mildred, Kan.	....	2.35	......
Nazareth, Penn.	....	2.15	......
Northampton, Penn.	....	1.75	......
Richard City, Tenn.	....	2.05	......
Steelton, Minn.	....	1.75	......
Toledo, Ohio	....	2.20	......
Universal, Penn.	....	1.60	......

NOTE—Add 40c per bbl. for bags. †10c disc., 10 days. ‡10c disc., 15 days. (a) With bags, 44c refund for paid freight bill. (b) With bags, 44c bbl. refund for paid freight bill. (c) With bags, 38c bbl. refund for paid freight bill. (1) Includes cloth bags at 40c. (2) 10c cash disc., 10c dealer discount. (f) "Velo" cement, including cost of paper bag, 10c disc. 10 days. ¶"Incor" Perfected, prices per bbl. packed in paper sacks, subject to 10c disc. 15 days. *Subject 25c bbl. dealer discount.

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chazy, N. Y.	.75	1.60	1.60	1.30	1.30	1.30
Dundas, Ont.	.53	1.05	1.05	.90	.90	.90
Farmington, Conn.	....	1.30	1.10	1.00	1.00	....
Ft. Spring, W. Va.	.35	1.35	1.35	1.35	1.25	1.15
Munns, N. Y.	.75	1.15	1.15	1.00	1.00	....
Rochester, N. Y.—Dolomite	1.50	1.50	1.50	1.50	1.50	1.50
Shaw's Junction, Penn. (e)	.85	1.35–1.60	1.35	1.35	1.35	1.35
Oriskany Falls, N. Y. (f)	.50–1.00	1.00–1.35	1.00–1.35	1.00–1.35	1.00–1.35	1.00–1.35
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Alton, Ill.	1.85	....	1.85	....	....	....
Davenport, Iowa	1.00	1.50	1.50	1.30	1.30	1.30
Dubuque, Iowa	.95	.95	.95	.95	.95	.95
Stolle and Falling Springs, Ill.	1.05–1.70	.95–1.70	1.15–1.70	1.05 1.70	1.05–1.70	....
Greencastle, Ind.	1.25	1.10	1.10	1.10	1.00	1.00
Lannon, Wis.	.80	1.00	1.00	.90	.90	.90
McCook, Ill.	.90	1.00	1.00	1.00	1.00	1.00
Montreal, Canada	.75–1.00	1.65–1.85	1.45	1.15	1.05	.95
Sheboygan, Wis.	1.20	1.20	1.20	1.20	....	....
Stone City, Iowa	.75	....	1.15	1.00	1.00	....
Toronto, Canada	2.50	2.70	2.50	2.50	2.50	2.50
Waukesha, Wis.	....	.90	....	.90	.90	....
Wisconsin points	.50	....	.100	.90	.90	....
Youngstown, Ohio	1.00	1.00	1.25	1.25	1.25	1.25
SOUTHERN:						
Cartersville, Ga.	1.00	1.65	1.65	1.35	1.15	1.15
Chico and Bridgeport, Texas	1.00–1.35	1.10–1.30	1.10–1.25	1.25	1.00–1.20	1.00
Cutler, Fla.	.50– .75r	....	....	1.75r	....	1.10g
El Paso, Texas	.50– .75r	1.00–1.25	1.00–1.25	1.00	1.00	1.00
Olive Hill, Ky.	1.00	1.00	1.00	.90	.90	.90
Rocky Point, Va.	.50– .75	1.40–1.60	1.30–1.40	1.15–1.25	1.10–1.20	1.00–1.05
WESTERN:						
Atchison, Kan.	.50	1.80	1.80	1.80	1.80	1.70
Blue Springs and Wymore, Neb. (t)	.25	1.45	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.10	1.25	1.25	1.25	1.00	....
Richmond, Calif.	.75	....	1.00	1.00	1.00	....
Rock Hill, St. Louis, Mo.	1.45	1.45	1.45	1.45	1.45	1.45
Stringtown, Okla.	1.00–1.35	1.10–1.30	1.10–1.25	1.25	1.00–1.20	1.00

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Birdsboro, Penn. (q)	1.20	1.60	1.45	1.35	....	1.30
Branford, Conn.	.80	1.70	1.45	1.20	1.05	....
Chico, Texas	2.50	2.00	1.45	1.20	1.15	....
Duluth, Minn.	.90–1.25	2.25–2.75	1.55	1.55	1.55	1.25
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Texas	2.50	2.00	1.45	1.25	1.20	1.15
New Britain, Plainville, Rocky Hill, Wallingford, Meriden, Mt. Carmel, Conn.	.80	1.70	1.45	1.20	1.05	....
Northern New Jersey	1.55	2.30	2.10	1.70	1.70	....
Richmond, Calif.	.70	....	1.00	1.00	1.00	....
Toronto, Canada	4.70	5.80	4.05	4.05	....	....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Cayce, S. C.—Granite	....	....	1.75	1.75	1.60	....
Chicago, Ill.—Granite	2.00	1.70	....	1.50	1.50	....
Eastern Pennsylvania—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40
Eastern Pennsylvania—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Emathla, Fla.—Flint rock	....	....	2.25–2.50s	....	....	....
Lithonia, Ga.—Granite	.50	1.75b	1.60	1.35	1.25	....
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	....
Middlebrook, Mo.	3.00–3.50	....	2.00–2.25	2.00–2.25	....	1.25–3.00
Richmond, Calif.—Quartzite	.75	....	1.00	1.00	1.00	....
Toccoa, Ga.—Granite	.40	....	1.40	1.25	1.25	1.25

(a) Limestone, ¼ to ⅛ in., 1.35 per ton; Lime flour, 8.50 per ton. (b) To ⅛ in. (c) 1 in., 1.40. (d) 2-in., 1.30. (e) Price net after 10c cash discount deducted. (f) Ballast, 75c per ton. (g) Per cu. yd., 3-in. and less. (n) Ballast, R.R., .90; run of crusher, 1.00. (q) Crusher run, 1.40; ¼-in. granlithic finish, 3.00. (r) Cu. yd. (s) 1-in. and less, per cu. yd. (t) Rip rap, 1.20–1.40 per ton.

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Allentown, Penn.	1.00–1.50	.40– .60	.80–1.00	.50– .80	.50– .80	.60– .80	.80
Bethlehem, Penn. (a)	1.25–1.75	.50– .70	....	.60– .80	.70– .80	.60– .90	.80
Buffalo, N. Y., Erie and Du Bois, Penn.	2.25	1.25	1.25	[illegible]	1.25	1.25	1.25
Hokendauqua, Penn.	1.25–1.75	.60	.90	.60– .90	.60– .90	.60– .90	....
Reading, Penn.	2.00	1.00	....	1.00	....	....	....
Swedeland, Penn.	1.50–2.50	.60–1.10	1.00–1.25	.90–1.25	.90–1.25	1.25	1.25
Western Pennsylvania	2.00	1.25	1.25	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05*	1.30*	1.80*	1.45*	1.45*	1.45*	....
Jackson, Ohio	2.05*	1.05*	1.80*	1.30*	1.05*	1.30*	....
Toledo, Ohio	1.50	1.10	1.25	1.25	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.	2.05*	1.30*	1.80*	1.45*	1.45*	1.45*	....
Ensley and Alabama City, Ala.	2.05	.55	1.25	1.15	.90	.90	.80
Longdale, Va.	2.50	.75	....	1.25	1.25	1.15	1.05
Woodward, Ala.†	2.05	.55*	....	1.15*	.90*	.90*	....

5c per ton discount on terms. †1¼ in. to ¼ in., $1.05; ⅝ in. to 10 mesh, $1.25*; ⅝ in. to 0 in., .90*; ¼ in. to 10 mesh, .80*. (a) Unwashed, 1.00–1.25.

Agricultural Limestone

(Pulverized)

Alton, Ill.—Analysis, 99% $CaCO_3$; .03% $MgCO_3$; 90% thru 100 mesh	4.00
Belfast, Me.—Analysis, $CaCO_3$, 90.4%; $MgCO_3$, trace, per ton	7.00
Branchton, Penn.—50% thru 100 mesh, in sacks, $5.00; bulk	3.50
Cape Girardeau, Mo.—Analysis, $CaCO_3$, 94½%; $MgCO_3$, 3½%; 90% thru 50 mesh	**1.50**
Cartersville, Ga.—90% thru 100 mesh, 2.00; 50% thru 50 mesh	1.50
Davenport, Iowa — Analysis, 92-98% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; sacks, per ton	6.00
Joliet, Ill.—Analysis, 52% $CaCO_3$; 48% $MgCO_3$; 90% thru 100 mesh	**3.50**
Knoxville, Tenn.—Analysis, 52% $CaCO_3$; 36% $MgCO_3$; 80% thru 100 mesh, bags, 3.75; bulk	2.50
Marion, Va.—Analysis, 90% $CaCO_3$, 2% $MgCO_3$; per ton	**2.00**
Marlbrook, Va.—(Lime marl)—Analysis, $CaCO_3$, 90%; 90% thru 100 mesh, in bags, 3.50–4.00; bulk	2.00–2.25
Middlebury, Vt.—Analysis, 99.05% $CaCO_3$; 90% thru 50 mesh	4.50
Sibley, Mich.—Analysis, 87.47% $CaCO_3$; 8.30% $MgCO_3$; 60% thru 100 mesh, bulk, per ton, 2.30; 100-lb. paper bags, f.o.b. Sibley, Mich., per ton	**3.75**

Agricultural Limestone

(Crushed)

Atlas, Ky.—Analysis, $CaCO_3$, 94-98%; $MgCO_3$, trace; 50% thru 4 mesh	1.00
Bedford, Ind.—Analysis, 98½% $CaCO_3$; ½% $MgCO_3$; 90% thru 10 mesh	1.50
Chico and Bridgeport, Tex. — Analysis, 95% $CaCO_3$; 1.3% $MgCO_3$; 90% thru 4 mesh	**1.00**
Charles-Town, W. Va.—Lime Marl—Analysis, 95% $CaCO_3$, 50% thru 100 mesh, bulk, 3.00; including burlap bags	**4.50**
Colton, Calif.—100% thru 14 mesh, bulk	3.50
Davenport, Iowa — Analysis, 92-98% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 4 mesh, 50% thru 20 mesh; bulk, per ton	1.10
Dubuque, Ia.—Analysis, 34.96% $CaCO_3$; 59.62% $MgCO_3$; 90% thru 4 mesh	**.95**
Dundas, Ont.—Analysis, 54% $CaCO_3$; $MgCO_3$, 43%; 50% thru 50 mesh	1.00
Fort Spring, W. Va.—Analysis, 90% $CaCO_3$; 3% $MgCO_3$; 50% thru 100 mesh	1.50
Hillsville, Penn.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$; 75% thru 100 mesh, sacked	**5.00**
Jamesville, N. Y.—Analysis, 90% $CaCO_3$; 5% $MgCO_3$; 90% thru 100 mesh; in sacks, 4.60; bulk	3.35
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh	**2.00**
Screenings (¼ in. to dust)	**1.00**
Marblehead, Ohio—90% thru 100 mesh	**3.00**
90% thru 50 mesh	**2.00**
90% thru 4 mesh	**1.00**
McCook and Gary, Ill.—Analysis, 60% $CaCO_3$, 40% $MgCO_3$; 90% thru 4 mesh	.90
Middlepoint, Bellevue, Bloomville, Kenton and Whitehouse, Ohio; Monroe, Mich.; Bluffton, Greencastle and Kokomo, Ind. —85% thru 10 mesh, 25% thru 100 mesh	**1.50**
Rocky Point, Va.—50% thru 200 mesh, bulk, in carloads, 2.00; 100-lb. paper bags, 3.25; 200-lb. burlap bags	**3.50**
Stolle and Falling Springs, Ill.—Analysis, 89.9% $CaCO_3$, 3.8% $MgCO_3$; 90% thru 4 mesh	1.15–1.70
Stone City, Iowa — Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75
West Stockbridge, Mass.* — Analysis, 95% $CaCO_3$; 90% thru 100 mesh, bulk	3.50
100-lb. paper bags, 4.75; 100-lb., cloth	5.25
Waukesha, Wis.—90% thru 100 mesh, 4.00; 50% thru 100 mesh	2.10

*Less 25c cash 15 days.

Pulverized Limestone for Coal Operators

Davenport, Iowa—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; sacks, ton	6.00
Hillsville, Penn., sacks, 5.10; bulk	3.50
Joliet, Ill.—Analysis, 50% $CaCO_3$; 42% $MgCO_3$; 90% thru 100 mesh (bags extra)	3.50
Rocky Point, Va.—Analysis, 97% $CaCO_3$; 75% $MgCO_3$; 85% thru 200 mesh, bulk	2.25–3.50
Waukesha, Wis.—90% thru 100 mesh, bulk	4.00

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.			12.00			17.50		2.00
Buffalo, N. Y.				12.00				
Knickerbocker, Devault, Cedar Hollow and Rambo, Penn.*		9.50	9.50	9.50		9.50	8.50	
Lime Ridge, Penn.	9.00	9.00	9.00		7.00		5.00	
CENTRAL:								
Afton, Mich.						10.75	7.50	12.11
Carey, Ohio	9.50	6.50	6.50		8.00		8.00	1.50
Cold Springs, Ohio		7.75	7.75		7.00	9.00	7.00	
Gibsonburg, Ohio	10.50		7.75		7.00	9.00	7.00	
Huntington, Ind.		6.50	6.50					
Little Rock, Ark.		14.40		15.40			11.90	1.79
Marblehead, Ohio		6.50	6.50				7.00	1.50[8]
Milltown, Ind.		7.50– 8.50		8.25– 9.25	7.00[5]	9.25[6]	6.50[7]	1.40[8]
Scioto, Ohio		7.00	7.00	8.00	8.00	.62½	7.00	1.50
Sheboygan, Wis.		10.50	10.50	10.50			9.50	2.00[4]
Tiffin, Ohio					8.00	10.00		
Wisconsin points		11.50					9.50	
Woodville, Ohio	10.50	7.75	7.75	11.50[24]	7.00	9.00[9]	7.00	1.50[3]
SOUTHERN:								
Keystone, Ala.	17.00	9.00	9.00	8.00–12.00			6.00[21]	1.35
Knoxville, Tenn.		9.00	9.00	9.00			8.00	
Ocala, Fla.		11.00					11.00[11]	
Pine Hill, Ky.		9.00	9.00	9.00			8.00	
WESTERN:								
Kirtland, N. M.							15.00‡	
Los Angeles, Calif.							12.00	
San Francisco, Calif.	19.00	14.00–17.00	12.50	14.00–19.00	14.50[20]	.90[17]	11.00[19]	1.85[17]
San Francisco, Calif.†	20.00	16.00	12.00	20.00	16.00		16.00	1.95

[1]Also 6.00. [2]To 1.35. [3]Wooden, steel, 1.60. [4]Steel. [5]To 7.50. [6]To 9.75. [7]To 7.00. [8]To 1.50 in steel drums; 1.25 and 1.35 in waterproof bags. [9]80-lb. [10]Per bbl. [11]To 14.00. [17]Less credit for return of empties. [19]To 14.50. [20]Also 13.00. [21]To 8.00. [24]Superfine, 92.25% thru 200 mesh. *Price to dealers. †Wood-burnt lime. ‡Also 12.00.

Wholesale Prices of Slate

Prices given are f.o.b. at producing point or nearest shipping point

Slate Flour

Pen Argyl, Penn.—Screened, 100% thru 200 mesh, 6.00 per ton in paper bags; 94% thru 300 mesh, 6.00 per ton in paper bags.

Slate Granules

Esmont, Va.—Blue, $7.50 per ton. Granville, N. Y.—**Red, green and black, $7.50 per ton.**
Pen Argyl, Penn.—Blue-grey, 6.50 per ton in 150-lb. paper bags (plus 10c per bag).

Roofing Slate

Prices per square—Standard thickness.

City or shipping point:	3/16-in.	¼-in.	⅜-in.	½-in.	¾-in.	1-in.
Arvonia, Va.—Buckingham oxford grey	13.88	19.44	24.99	29.44	34.44	45.55
Bangor, Penn.—No. 1 clear	10.50–14.50	24.50	29.00	33.50	44.50	55.60
No. 1 ribbon	9.00–10.25	20.00	24.50	29.00	40.00	51.25
Gen. Bangor No. 2 ribbon	6.75– 7.25					
Gen. Bangor mediums	9.50–11.25					
No. 1 Albion clear	9.00–10.50	16.00	23.00	27.00	37.00	46.00
Chapman Quarries, Penn.—No. 1	8.50–11.25	(Vari-tone, 12.00–13.00)				
Medium	7.75– 9.00					
Hard vein		16.00	23.00	26.00	32.00	40.00
Granville, N. Y.—Sea green, weathering	14.00	24.00	30.00	36.00	48.00	60.00
Semi-weathering, green and gray	15.40	24.00	30.00	36.00	48.00	60.00
Mottled purple and unfading green	21.00	24.00	30.00	36.00	48.00	60.00
Red	27.50	33.50	40.00	47.50	62.50	77.50
Monson, Maine	19.80	24.00				
Pen Argyl, Penn.*						
Graduated slate (blue)		16.00	23.00	27.00	37.00	46.00
Graduated slate (grey)		18.00	25.00	29.00	39.00	48.00
Color-tone	11.50–12.50; Vari-tone, 12.00–13.00; Cathedral gray, 14.00–15.00					
No. 1 clear (smooth text)	7.25–10.50; No. 1 clear (rough text), 8.25–9.50					
Albion-Bangor medium	8.00–9.00; No. 2 clear, 8.00–9.00; No. 1 ribbon, 8.00–8.50					
Slatedale and Slatington, Penn.—						
Genuine Franklin	11.25	22.00	26.00	30.00	40.00	50.00
Blue Mountain No. 1	10.50	22.00	26.00	30.00	40.00	50.00
Blue Mountain No. 1 clear	9.50	18.00	22.00	26.00	36.00	46.00
Blue Mountain No. 2 clear	8.00	18.00	22.00	26.00	36.00	46.00

(a) Prices are for standard preferred sizes (standard 3/16-in. slates), smaller sizes sell for lower prices.
(b) Prices other than 3/16-in. thickness include nail holes.
(c) Prices for punching nail holes, in standard thickness slates, vary from 50c to $1.25 per square.
*Unfading grey, 14.00–15.00; 10% disc. to roofer; 10%–8⅓% to wholesaler.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Chatsworth, Ga.:	
Crude talc, per ton	5.00
Ground talc (20-50 mesh), bags	6.50
Ground talc (150-200 mesh), bags	9.00
Pencils and steel crayons, gross	1.50– 2.00
Chester, Vt.—Finely ground talc (carloads), Grade A—99-99¾% thru 200 mesh, 8.00–8.50; Grade B, 97-98% thru 200 mesh	7.50– 8.00
1.00 per ton extra for 50-lb. paper bags; 166⅔-lb. burlap bags, 15c each; 200-lb. burlap bags, 18c each. Credit for return of bags. Terms 1%, 10 days.	
Clifton, Va.:	
Crude talc, per ton	4.00
Ground talc (150-200 mesh), in bags	12.00
Conowingo, Md.:	
Crude talc, bulk	4.00
Ground talc (150-200 mesh), in bags	14.00
Cubes, blanks, per lb.	.10
Emeryville, N. Y.:	
Ground talc (200 mesh), bags	13.75
Ground talc (325 mesh), bags	14.75
Hailesboro, N. Y.:	
Ground talc (300-350 mesh) in 200-lb. bags	15.50–20.00
Henry, Va.:	
Crude (mine run)	3.50– 4.00
Ground talc (150-200 mesh), bags	6.25–10.50
Joliet, Ill.:	
Ground talc (200 mesh) in bags:	
California white	30.00
Southern white	20.00
Illinois talc	10.00
Los Angeles, Calif.:	
Ground talc (150-200 mesh) in bags	16.00–25.00
Natural Bridge, N. Y.:	
Ground talc (325 mesh), bags	10.00–15.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 65-72%	3.75– 4.25
Mt. Pleasant, Tenn.—B.P.L., 75%	6.50
Run of plant fines, 72% B.P.L., per ton of 2000 lb.	5.00

Ground Rock

(2000 lb.)

Gordonsburg, Tenn.—B.P.L. 65–70%	3.75– 4.25
Mt. Pleasant, Tenn.—Lime phosphate: B.P.L., 72½%	11.20
Mt. Pleasant, Tenn.—B.P.L., 72%	5.00– 5.50

Florida Phosphate

(Raw Land Pebble)
(Per Ton)

Florida—F.o.b. mines, gross ton, 68/66% B.P.L., Basis 68%	3.25
70% min. B.P.L., Basis 70%	3.75

Mica

Prices given are net, f.o.b. plant or nearest shipping point.

Pringle, S. D.—Mine run, per ton	100.00–125.00
Punch mica, per lb.	.06
Scrap, per ton, carloads	20.00
Rumney Depot, N. H.—Per ton,	
Mine run	300.00–360.00
Clean shop scrap	27.50–29.00
Mine scrap	22.50
Roofing mica	a37.50–40.00
Punch mica, per ton	200.00–240.00
Trimmed mica, per ton, 40 mesh, 42.50–45.00; 100 mesh, 60.00; 200 mesh	100.00
Trenton, N. J.—Mine scrap, per ton	20.00
Clean shop scrap, per ton	22.00

(a) Also 38.00–42.50 per ton.

Gypsum Products— CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

	Crushed Rock	Ground Gypsum	Agri-cultural Gypsum	Stucco Calcined Gypsum	Cement and Gaging Plaster	Wood Fiber	Gaging White	Plaster Sanded	Cement Keene's	Finish Trowel	—Plaster Board— ¼x32x 36". Per M Sq. Ft.	⅜x32x 36". Per M Sq. Ft.	Wallboard. ⅜x32 or 48" Lengths 6'-10'. Per M Sq. Ft.
Acme, Tex.	1.50–3.00	4.00	4.00	4.00–6.00	4.00–6.00	4.00–6.00	10.00	10.00	19.00	19.00	10.50	10.50	12.00
Blue Rapids, Kan.	1.50–3.00	4.00	4.00	4.00–6.00	4.00–6.00	4.00–6.00	10.00	10.00	19.00	19.00	10.50	10.50	12.00
Centerville, Iowa			6.00	7.00		7.50	8.50	10.50a					
East St. Louis, Ill.—Special Gypsum Products—Partition section, 4 in. thick, 12 in. wide, and up to 10 ft. 3 in. long, 12c per ft., 21.00 per ton; outside wall section and interior bearing wall section, 6 in. wide, 6 in. thick, and up to 10 ft. 3 in. long, 25c per ft., 30.00 per ton; floor section, 7 in. thick, 16 in. wide, and up to 13 ft. 3 in. long, 17c per ft., 23.00 per ton.													
Ft. Dodge, Iowa; N. Holston, Va.; Akron, N. Y.	1.50–3.00	4.00	4.00	4.00–6.00	4.00–6.00	4.00–6.00	10.00	10.00	19.00	19.00	10.50	10.50	12.00
Grand Rapids, Mich.			7.00d		8.00d	8.00d	19.85c	8.00d	29.25e	21.00d		15.00	22.50
Los Angeles, Calif. (b)			7.00–9.50	7.00–9.50	10.00-12.00		10.00–12.00						
Medicine Lodge, Kan.	1.45						11.50d		15.00y				
Portland, Colo.		7.00	7.00	9.00	9.00	9.50	9.00		27.50		22.50	27.50	
Providence, R. I. (x)				12.00–13.00e									
Seattle, Wash. (z)	6.00	9.00	9.00	13.00			14.00						
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00						25.00g	33.00f

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable). (a) White molding. (b) Plasterboard, ⅜-in., 16c-17c sq. yd. (c) Satin Spar, in paper bags. (d) Includes paper bags. (e) Includes jute sacks. (f) "Gyproc," ⅜ in. by 48 in. by 5 and 10 ft. long. (g) ⅜ in. by 48 in. by 3 to 4 ft. (x) "Fabricaste" gypsum blocks, 2- and 3-in., f.o.b. motor trucks at plants, 7¼c-8¼c. Block setting plaster, per ton, in jute sacks, 12.00. (y) Jute sacks, 18.00; paper sacks, 16.00. (z) Gypsum partition tile, 3-in., 9c per sq. ft.; 4-in., 11c per sq. ft.

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Brandon. Vt.—English pink, cream and coral pink	¶12.50–‖14.50	¶12.50–‖14.50
Cranberry Creek, N. Y.—Bio-Spar, per ton in bags in carload lots, 9.00; less than carload lots, 12.00 per ton in bags, bulk, per ton	....	7.50
Crown Point, N. Y.—Mica Spar	....	¶9.00–‖12.00
Davenport, Iowa — White limestone, in bags, per ton	‖6.00	‖6.00
Easton, Penn.—Royal green	16.00–20.00a	....
Harrisonburg, Va.	11.00–14.50	....
Middlebrook, Mo.—Red	....	20.00–25.00
Middlebury, Vt. — Middlebury white	....	¶9.00–‖10.00
Middlebury and Brandon, Vt.—Caststone, per ton, including bags	....	c5.50
Phillipsburg, N. J.—Royal green granite	....	15.00–18.00
Randville, Mich.—Crystalite white marble, bulk	4.00	4.00– 7.00
Stockton, Calif.—"Nat-rock" roofing grits	....	12.00–40.00
Tuckahoe, N. Y.—Tuckahoe white	8.00	
Warren, N. H.	....	8.00–15.00

¶C.L. ‖L.C.L. (a) Including bags. (b) In burlap bags, 2.00 per ton extra. *Per 100 lb. (c) Per ton f.o.b. quarry in carloads; 7.00 per ton L.C.L.

Soda Feldspar

De Kalb Jct., N. Y.—Color, white; pulverized (bags extra, burlap 10c each, paper 6c each); 140 mesh, 16.00; 200 mesh 18.00

Potash Feldspar

Auburn and Topsham, Me.—Color white, 98% thru 140 mesh (bulk) 19.00

Bedford Hills, N. Y.—Color, white; analysis, K_2O, 12.26%; Na_2O, 2.86%; SiO_2, 66.05%; Fe_2O_3, .08%; Al_2O_3, 18.89%; pulverized 78% thru 100 mesh, bulk, 11.00–14.00; crude, bulk, per ton 9.00

Coatesville, Penn.—Color, white; analysis, K_2O, 12.30%; Na_2O, 2.86% SiO_2, 66.05%; Fe_2O_3, .08%; Al_2O_3, 18.89%; crude, per ton 8.00

Erwin, Tenn.—White; analysis, K_2O, 12%; Na_2O, 3.5%; SiO_2, 68%; Fe_2O_3, .07%; Al_2O_3, 18.5% pulverized, 95% thru 325 mesh, in bags, 15.00–17.50; bulk, 15.00–17.00; crude feldspar, bulk 9.00

Trenton, N. J.—White; analysis, K_2O, 13-14%; Na_2O, 2-2½%; SiO_2, 64-65%; Fe_2O_3, 0.07%; Al_2O_3, 18.50-19.25%; pulverized, 97% thru 325 mesh, crude, 8.50 per ton, ground 21.00

Rumney and Cardigan, N. H.—Color, white; analysis, K_2O, 9-12%; Na_2O, trace; SiO_2, 64-67%; Al_2O_3, 17-18%, crude, bulk 7.00– 7.50

Rumney Depot, N. H.—Color, white; analysis, K_2O, 8-13%; Na_2O, 1-1½%; SiO_2, 62-68%; Al_2O_3, 17-18%, crude, bulk 7.00– 7.50

Penland, N. C.—White; crude, bulk 8.00
Ground, bulk 16.50

Spruce Pine, N. C.—Color, white; analysis, K_2O, 10%; Na_2O, 3%; SiO_2, 68%; Fe_2O_3, 0.10%; Al_2O_3, 18%; 99½% thru 200 mesh; pulverized, bulk 18.00
(Bags 15c extra.)

Cement Drain Tile

Graettinger, Iowa.—Drain tile, per foot: 5-in., .04½; 6-in., .05½; 8-in., .09; 10-in., .12½; 12-in., .17½; 15-in., .35; 18-in., .50; 20-in., .60; 24-in., 1.00; 30-in., 1.35; 36-in. 2.00

Longview, Wash.—Drain tile, per 100 ft.
- 3-in. 5.00
- 4-in. 6.00
- 6-in. 10.00

Tacoma, Wash.—Drain tile, per 100 ft.
- 3-in. 4.00
- 4-in. 5.00
- 6-in. 7.50
- 8-in. 10.00

Chicken Grits

Centerville, Iowa	9.25
Belfast, Me.—(Agstone), per ton, in carloads	10.00
Chico, Tex.—Hen size and Baby Chick, packed in 100-lb. sacks, per ton	8.50–10.00
Coatesville, Penn.—(Feldspar), per ton, in bags of 100 lb. each	8.00
Cranberry Creek, N. Y.—Per ton, in carload lots; in bags, 9.00; bulk, 7.50. Less than carload lots, in bags	12.00
Davenport, Iowa — High calcium carbonate limestone, in bags L.C.L., per ton	6.00
El Paso, Texas—(Limestone) per 100-lb. sack	.75
Los Angeles, Calif.—Per ton, including sacks: Gypsum	7.50– 9.50
Middlebury, Vt.—Per ton (a)	10.00
Randville, Mich.—(Marble), bulk	6.00
Seattle, Wash.—(Gypsum), bulk, ton	10.00
Warren, N. H.	8.50– 9.50
Waukesha, Wis.—(Limestone), per ton	7.00
West Stockbridge, Mass.	¶7.50–‖9.00
Wisconsin Points—(Limestone), per ton	15.00

(a) F.o.b. Middlebury, Vt. ¶C.L. ‖L.C.L.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Dayton, Ohio	12.50–13.50
Detroit, Mich. (d)	e13.00–16.00*b
Farmington, Conn.	16.00
Grand Rapids, Mich.*	14.00–15.00
Jackson, Mich.	13.00
Madison, Wis.	12.50a
Mishawaka, Ind.	11.00
Milwaukee, Wis.	13.00*
Minneapolis, Minn.	10.00*
New Brighton, Minn.	8.00
Pontiac, Mich.	13.50
Portage, Wis.	15.00
Rochester, N. Y.	19.75
Saginaw, Mich.	13.50
San Antonio, Texas	12.50
Sebewaing, Mich.	12.50
South St. Paul, Minn.	9.00
Syracuse, N. Y.	13.00–15.00
Toronto, Canada (f)	13.00–15.00b
Winnipeg, Canada	15.00

Delivered on job. (a) Less 50c disc. per M 10th of month. (b) 5% disc., 10th of month. (c) Delivered in city. (d) Also 15.50. (e) Also 14.00. (f) Also 10.75; 13.00 f.o.b. jobs, less 2.25 average cartage. (g) F.o.b. yard.

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point.

City or shipping point	Size 8x8x16
Camden, N. J.	16.50
Chicago District	180.00–210.00a
8x10x16	230.00–260.00a
8x12x16	280.00–330.00a
Columbus, Ohio	13.00b– 15.00†
Forest Park, Ill.	21.00*
Grand Rapids, Mich.	11.00*
Graettinger, Iowa	.18– .20
Indianapolis, Ind.	.10– .12a
Los Angeles, Calif.:	
4x8x12	4.50*
4x6x12	3.90*
4x4x12	2.90*

*Price per 100 at plant.
†Rock or panel face.
(a) Face. (b) Plain.

Cement Roofing Tile

Prices are net per square, carload lots, f.o.b. nearest shipping point, unless otherwise stated.

Camden and Trenton, N. J.—8x12, per sq.:
- Red 15.00
- Green 18.00

Cicero, Ill.—French and Spanish tile (red, orange, choc., yellow, tan, slate, gray) per sq., 9.50–10.00; green or blue, per sq. ... 11.50–12.00

Detroit, Mich.—5x8x12, per M 67.50

Houston, Texas—Roofing Tile, per sq. 25.00

Indianapolis, Ind.—9x15-in. — Per sq.
- Gray 10.00
- Red 11.00
- Green 13.00

Cement Building Tile

Camden and Trenton, N. J.:	
3x8x16, per 100, 9.00; 3x9x16, per 100	9.00
4x8x16, per 100, 12.00; 4x9x16, per 100	13.00
6x8x16, per 100, 16.50; 6x9x16, per 100	15.50
Chicago District (Haydite):	
4x 8x16, per 100	13.00
8x 8x16, per 100	20.00
8x12x16, per 100	28.00
Columbus, Ohio:	
5x8x12, per 100	6.00
Grand Rapids, Mich.:	
5x8x12, per 100	6.00
Houston, Texas:	
5x8x12 (Lightweight), per M	80.00
Longview, Wash.:	
4x6x12, per 1000	55.00
4x8x12, per 1000	64.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Camden & Trenton, N. J.	17.00	....
Chicago District "Haydite"	14.00	....
Columbus, Ohio	16.00	17.00
Ensley, Ala. ("Slagtex")	13.00a	....
Forest Park, Ill.	....	37.00
Longview, Wash.	16.50	20.00– 40.00
Milwaukee, Wis.	14.00	18.00–20.00
Omaha, Neb.	17.00	30.00– 40.00
Philadelphia, Penn.	15.50	....
Portland, Ore.	12.00	22.50– 55.00
Prairie du Chien, Wis.	14.00	22.00– 25.00
Rapid City, S. D.	18.00	30.00– 40.00

(a) Delivered on job; 10.00 f.o.b. plant.

Fullers Earth

Prices per ton in carloads, f.o.b. Florida shipping points.

16– 30 mesh	20.00
30– 60 mesh	22.00
60–100 mesh	18.00
100 mesh and finer	9.00

Note—Bags extra and returnable for full credit.

Stone-Tile Hollow Brick

Prices are net per thousand f.o.b. plant.

	No. 4	No. 6	No. 8
Albany, N. Y.*†	40.00	60.00	70.00
Asheville, N. C.	35.00	50.00	60.00
Atlanta, Ga.	29.00	42.50	53.00
Brownsville, Tex.	....	53.00	62.50
Brunswick, Me.†	40.00	60.00	80.00
Charlotte, N. C.	35.00	45.00	60.00
De Land, Fla.	30.00	50.00	60.00
Farmingdale, N. Y.	37.50	50.00	60.00
Houston, Tex.	35.00	45.00	60.00
Jackson, Miss.	45.00	55.00	65.00
Klamath Falls, Ore.	65.00	75.00	85.00
Longview, Wash.	....	55.00	64.00
Los Angeles, Calif.	29.00	39.00	45.00
Mattituck, N. Y.	45.00	55.00	65.00
Medford, Ore.	50.00	55.00	70.00
Memphis, Tenn.	50.00	55.00	65.00
Mineola, N. Y.	45.00	50.00	60.00
Nashville, Tenn.	30.00	49.00	57.00
New Orleans, La.	35.00	45.00	60.00
Norfolk, Va.	35.00	50.00	65.00
Passaic, N. J.	35.00	50.00	65.00
Patchogue, N. Y.	....	60.00	70.00
Pawtucket, R. I.	35.00	55.00	75.00
Safford, Ariz.	32.50	48.75	65.00
Salem, Mass.	40.00	60.00	75.00
San Antonio, Tex.	37.00	46.00	60.00
San Diego, Calif.	35.00	44.00	52.50

Prices are for standard sizes—No. 4, size 3½x4x12 in.; No. 6, size 3½x6x12 in.; No. 8, size 3½x8x12 in. *Delivered on job. †10% disc.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted

Culvert and Sewer	4 in.	6 in.	8-in.	10 in.	12 in.	15-in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.
Grand Rapids, Mich. (b)	.....	.....	.....	.60	.70	.90	1.20	.....	.....	1.80	2.10	2.35	3.50	4.00	5.60	6.90	7.85
Houston, Texas	.....	.19	.28	.43	.55½	.90	1.30	.....	1.70†	2.20	.....	.....	.....	.....	.....	.....	.....
Indianapolis, Ind. (a)	.....	.....	.....	.75	.85	.90	1.15	.....	.....	1.60	.....	2.50	.....	.....	.....	.....	.....
Norfolk, Neb. (b)	.....	.....	.....	.90	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Tiskilwa, Ill. (rein.)	.....	.....	.....	.75	.85	.95	1.20	1.60	.....	2.00	.....	2.75	3.40	.....	6.50	.....	10.00
Tacoma, Wash.	.15	.18	.22½	.30	.40	.55	.75										
Wahoo, Neb. (b)	.....	.....	.....	.....	.85½	.....	1.14	.....	.....	1.81	.....	2.47	3.42	4.13	5.63	6.49	7.31

(a) 24-in. lengths. (b) Reinforced. †21-in. diameter.

Cement Bid at $1.05 Per Bbl. for Big Tujunga Job

LOS ANGELES county supervisors are considering the lowest bids on cement in recent years, bulk cement for the construction of the Big Tujunga dam being offered at $1.05 per bbl. f.o.b. mill, with a delivered price of $1.96 per bbl. This bid was submitted by the Southwestern Portland Cement Co. Three other bidders for the Big Tujunga cement contract were the Riverside, California and Monolith companies, all with a delivered price of $1.96 per bbl., although their mill prices differed.

No action has been taken by the county board, although it is customary in such cases to award the contract in equal shares to the low bidders.—*Los Angeles* (Calif.) *Express.*

Recent Contract Prices

Madison County, Wis.—C. E. Harshman awarded contract by county commissioners for 15,000 cu. yd. of gravel at 55 c. per cu. yd.

Seattle, Wash. — Pioneer Sand and Gravel Co. submitted low bid to city of Seattle of $5.40 per cu. yd. for furnishing and placing 243 cu. yd. of concrete. Other bidders were: Crosby Lighterage Co., $6.75; H. W. Stewart, $6.97, and Fioirto Bros., $9.

Colfax, Wash.—County commissioners awarded contract to P. O. Blair for 1500 cu. yd. of crushed rock at $1.25 per cu. yd., delivered at Colfax or any other county point.

Milwaukee Cement Awards

THE Building Materials Co-operative Association of Milwaukee, Wis., was awarded a contract by the city of Milwaukee purchasing board for 10,000 bbl. of cement, despite the lack of an opinion on the fairness of the price asked by the state marketing commission.

The board sought such an opinion after prices proved to be higher this year than last, despite the fact assurance was given that lower prices would probably prevail through the cutting of overhead in delivery, etc., through a co-operative. However, investigation proved that cement prices have risen in districts outside of Milwaukee.

The gross price will be $2.60 per bbl., delivered. This is an increase of 7 cents over last year.—*Milwaukee* (Wis.) *News.*

Contractors' Forecast of 1930 Construction

THE OUTLOOK for construction activity in 1930 is less definite than at the start of any recent year, according to E. J. Harding, assistant general manager of the Associated General Contractors of America. Estimates for next year range from $7,500,000,000 to between nine and ten billion. All the factors that will affect the construction program during the ensuing year are to be reviewed in detail at the annual convention of the Asociated General Contractors which opens at the Jung Hotel in New Orleans, January 20, 1930.

According to Mr. Harding the stabilization of the stock market at moderate levels is generally looked upon as beneficial to the promotion of construction because of the release of finances to local banks, industries, building and loan associations, etc. This release of funds, coupled with the intention of governmental and business leaders to stimulate construction work, makes computation on the basis of current statistics extremely hazardous.

Those forecasts that depend on current statistical data indcate a construction total between $7,500,000,000 and $8,000,000,000, as compared with forecasts of $8,500,000,000 in 1928 and 1929. Where the objectives of the government departments and business leaders influence forecasts, these show an increase and range from $8,500,000,000 to $9,500,000,000 and more. As justification for these larger figures the forecasters which use them point out that the Boulder Dam project of the federal government alone will probably usher in nearly $1,000,000,000 in construction when all the supplementary operations involved are considered. Again, the volume of highway and public works construction, as pledged by most of the states and other public bodies, is taken to indicate an increase in the total amount of such commitments during 1930. None of this prospective work, however, has arrived at the stage where it can be shown in current statistics either as bonds issued, bids called for, or contracts awarded.

Private construction operations, which will largely be governed by the availability of funs for mortgage and other purposes, are likewise difficult to forecast, Mr. Harding states. Surveys by real estate boards show that there is no apparent overbuilding of a national character and that a better than normal demand for new space exists. If money is made available locally through the release of funds from securities markets there should soon be statistical evidence fo the trend in private construction, although such evidence is not yet manifest.

Despite the present lack of statistical indicators, the Associated General Contractors look for some increase in activity in 1930 over the volume of 1929. It is conceded, however, that this might not become evident during the early months of the year.

Retail Prices of Various Rock Products Materials

THE TABLE below gives average prices paid December 1, 1929, by contractors for various rock products, delivered on the job at different principal cities of the United States. These prices were secured through the Bureau of Census.

AVERAGE RETAIL PRICES FOR ROCK PRODUCTS MATERIALS, DECEMBER 1, 1929

	MATERIAL					
City	Portland cement, per bbl. excl. of cont.	Gypsum wallboard, 3/8-in., per M	Hydrated lime, per ton	Building sand, per cu. yd.	Crushed stone, 3/4-in., per ton	Gypsum plaster, neat, per ton
New Haven, Conn.	$2.80	......	$20.00	$1.55	$2.25	......
Waterbury, Conn.	3.00	$30.00	20.00	1.35	2.45	$20.00
New London, Conn.	3.00	25.00	26.00	1.50	2.40	18.00
New Bedford, Mass.	2.85	25.00	18.00	1.75	3.00	18.50
Haverhill, Mass.	2.80	27.50	20.00	......	......	18.75
Poughkeepsie, N. Y.	2.04	......	......	2.25	2.20	......
Albany, N. Y.	2.97	24.75	18.00	......	......	17.10
Rochester, N. Y.	2.70	20.00	20.00	2.50	2.40	14.00
Syracuse, N. Y.	3.00	22.50	26.00	2.00	2.00	17.00
Buffalo, N. Y.	3.10	25.00	18.00	2.50	2.05	14.00
Paterson, N. J.	2.60	23.00	20.00	1.75	2.08	17.00
Trenton, N. J.	2.40	26.00	18.00	1.50	2.10	17.50
Scranton, Penn.	2.80	......	18.00	3.25	......	17.00
Philadelphia, Penn.	2.35	......	15.50	1.75	2.40	19.75
Baltimore, Md.	2.75	......	13.00	2.00	3.00	16.50
Washington, D. C.	2.25	25.00	14.00	......	......	16.00
Richmond, Va.	3.10	31.00	17.50	1.95	2.45	20.00
Fairmount, W. Va.	2.90	35.00	17.00	3.25	3.50	18.00
Winston-Salem, N. C.	2.44	......	......	2.50	3.60	15.00
Atlanta, Ga.	2.85	......	15.00	3.04	3.00	16.50
Louisville, Ky.	2.40	......	15.50	2.20	2.43	17.00
Tampa, Fla.	2.40	......	24.00	2.00	4.25	22.50
Birmingham, Ala.	3.00	......	20.00	3.00	......	17.00
Erie, Penn.	2.60	25.00	17.00	2.25	......	16.00
Toledo, Ohio	......	$22.50	$20.00	$3.04	$2.50	$16.00
Columbus, Ohio	2.75	23.00	17.50	2.25	2.50	15.00
Cleveland, Ohio	2.56	22.00	16.00	2.57	2.65	12.50
Youngstown, Ohio	2.95	......	20.00	3.71	2.75	......
Detroit, Mich.	2.60	24.00	14.80	2.75	3.00	18.00
Saginaw, Mich.	2.80	25.00	20.00	2.50	3.00	18.00
Terre Haute, Ind.	2.75	28.00	18.00	1.65	3.50	17.00
Chicago, Ill.	1.80	......	15.00	1.63	1.90	14.50
Milwaukee, Wis.	2.60	25.00	......	2.00	2.00	18.00
Lansing, Mich.	2.90	......	20.00	2.25	2.25	16.00
Des Moines, Iowa	2.66	23.75	20.00	1.60	3.60	......
St. Louis, Mo.	2.35	......	18.00	2.70	1.90	17.00
Kansas City, Mo.	2.40	25.00	23.00	2.00	1.87	15.00
St. Paul, Minn.	2.60	25.00	21.00	1.40	2.00	16.00
Sioux City, Iowa	2.80	27.00	26.00	1.50	2.25	16.00
Grand Forks, N. D.	3.00	......	23.00	2.60	......	16.00
San Antonio, Tex.	2.82	37.00	20.00	2.10	2.35	20.90
Tucson, Ariz.	......	......	30.00	1.50	2.50	15.00
Los Angeles, Calif.	2.20	34.00	24.00	2.30	2.05	17.50
Long Beach, Calif.	2.46	34.00	26.00	2.16	2.30	17.50
San Francisco, Calif.	2.60	......	22.50	1.40	1.65	20.00
Seattle, Wash.	2.65	32.50	22.00	1.40	......	20.00
Portland, Ore.	2.60	27.50	25.00	2.00	1.60	19.00

Sand-Lime Brick Production and Shipments in December

THE following data are compiled from reports received direct from 22 producers of sand-lime brick located in various parts of the United States and Canada. The number of plants reporting is one less than those furnishing statistics for the November estimate, published in the December 21 issue. The statistics below may be regarded as representative of the entire industry, the reporting plants having about one-half the production capacity in the United States and Canada.

Production decreased considerably in December, six plants reporting that they were not at present producing. Shipments by rail and truck also decreased, as did unfilled orders. Stocks on hand remain about the same.

The following are average prices quoted for sand-lime brick in December:

Shipping Point	Plant Price	Delivered
Boston, Mass.	$12.00	$16.00
Dayton, Ohio	12.50	15.50
Detroit, Mich.	....	15.85
Detroit, Mich.	....	15.50@16.00
Detroit, Mich.	....	15.50
Detroit, Mich.	12.00	15.75
Gr'd Rapids, Mich.	14.00@15.00	....
Jackson, Mich.	13.00	....
Madison, Wis.	12.00@12.50	12.00@14.00
Menominee, Mich.	11.00	13.50
Milwaukee, Wis.	10.50	13.00
Minneapolis, Minn.	8.00	10.00
Mishawaka, Ind.	11.00	....
Pontiac, Mich.	12.50	14.50
Syracuse, N. Y.	18.00	20.00
West Toronto, Can.	....	13.30
Winchester, Mass.	....	16.00
Winnipeg, Can.	....	15.00

The following statistics are compiled from data received from 22 producers in the United States and Canada:

Statistics for November and December

	*November	†December
Production	14,011,000	7,955,000
Shipments (rail)	4,956,000	2,443,000
Shipments (truck)	9,938,000	4,587,000
Stocks	10,854,000	10,307,000
Unfilled orders	9,708,000	5,325,000

*Twenty-three plants reporting; incomplete, two plants not reporting stocks on hand, and seven plants not reporting unfilled orders.

†Twenty-two plants reporting; incomplete, one plant not reporting rail and truck shipments, three plants not reporting stocks on hand, and eight plants not reporting unfilled orders.

Notes from Producers

Walker and Frank Brick Co., Detroit, Mich., are shipping considerable sand-lime brick for basements.

Grande Brick Co., Grand Rapids, Mich., reports that at its annual directors' meeting of the company the stockholders reluctantly accepted the resignation of its president, John L. Jackson, and Henry O. Joseph, secretary and general manager, who have been interested in the concern for 20 years. The new officers are J. W. Van Brunt, president; Charles W. Garfield, vice-president; E. D. Church, treasurer, and Truman A. King, secretary and general manager. Mr. Jackson and Mr. Joseph remain with the company as directors.

The plant of the Acme Brick Co., Milwaukee, Wis., was shut down the last week of November and the first two weeks of December, due to engine damage.

Stone Company Sues Railroad for Lack of Car Service

THE Interstate Commerce Commission in a recent decision characterized as "unjust and prejudicial" failure of the Chicago, Indianapolis and Louisville railroad to supply the Alexander King Stone Co. with freight cars for loading stone at a quarry near Stinesville, Ind.

The stone company, which recited its futile efforts to obtain sufficient cars in six months up to March, 1928, is asking for damages in the sum of $119,000. Another hearing on damages probably will be held in view of the commission's decision upholding the stone company's contention.—*Indianapolis* (Ind.) *News.*

Kenneth E. Casparis in Manitoba

A LETTER from Kenneth E. Casparis, well-known operator in the quarry industry, states that he has completed his engineering work for the Winnipeg Electric Co., Ltd., at its Seven Sisters hydroelectric project, which included a cost study of quarry and crushing plant operation and the design of a projected crushing plant to make 1000 cu. yd. of crushed stone per day. The rock was to be quarried in connection with the excavation for the tail race of the power plant.

Mr. Casparis is now with John Gunn and Sons, Ltd., engineers and contractors., Slave Falls, Man., and is at work on the design and erection of a 1000-cu. yd. per day crushing and central concrete-mixing plant, where bulk cement shipments will be handled, on the Slave Falls hydroelectric project on the Winnipeg river 100 miles northeast of Winnipeg. He is particularly interested in hearing from other engineers and manufacturers in regard to experience and methods of handling cement in bulk.

U. S. Gypsum to Distribute Chromite Co.'s Products

THE UNITED States Gypsum Co. has completed arrangements to take over the distribution, dealer and agency organization of Chromite Co., Quincy, Ill., manufacturers of metal wall tile.

Capacity production of Chromite Co.'s plant at Quincy, Ill., is now being increased to 5,000,000 sq. ft. and it is contemplated that it will be increased to 10,000,000 later in 1930. Selling organization consists of 100 dealers, distributers and agents. This is the third product which the United States Gypsum Co. has contracted to distribute in addition to its own lines.—*Wall Street Journal.*

American Concrete Institute Program

THE 26th annual convention of the American Concrete Institute will be held at the Roosevelt hotel, New Orleans, La., February 11, 12 and 13, as already announced. The Cast-Stone Institute and National Concrete Products Association will hold their conventions in New Orleans at the same time.

Papers of special interest to rock products producers include: "Specification for Centrally-Mixed Concrete," by Miles N. Clair, vice-president, Thompson and Lichtner Co., Boston, Mass., whose article on the Boston Concrete Corp's plant in ROCK PRODUCTS, November 9, 1929, will doubtless be recalled; "Design and Operation of Central-Mixing Plants," by Frank I. Ginsberg. Cement manufacturers will be interested in the discussion of the paper by P. H. Bates, already published (*Journal of the American Concrete Institute*) on "Variations in Standard Cements." The other papers on the program deal more especially with the design and construction of concrete and reinforced-concrete buildings and structures.

Shiely Company Building New Ballast Plant at Wenatchee

INSTALLATION of gravel washing, crushing and screening equipment at a cost of more than $150,000 is now under way at Olds station near Wenatchee, Wash., on the Great Northern railroad by the J. L. Shiely Co. of St. Paul, Minn. Plans call for the operation of the plant for railroad ballast for five years, after which it will be placed on a commercial basis, supplying gravel for road construction work in north central Washington.

No Merger of Eastern Rock Products and Boland Interests

THE RECENT report, current in newspapers of upper New York state, to the effect that a merger had been consummated by Eastern Rock Products, Inc., Utica, and Frank J. Boland, Inc., Binghamton, has been denied by officials of the interested companies. According to H. V. Owens, president of the Eastern company, the "merger" news was an outgrowth of an arrangement between his company and the Boland interests whereby the latter company was to handle the products of the Eastern company in the Binghamton district.

"We have not entered into any merger," said Mr. Owens. "We will continue to operate our own plants as heretofore. We have an arrangement whereby we are to produce the material and Mr. Boland is to sell it for us in the territory in and around Binghamton."—*Utica* (N. Y.) *Observer.*

New Machinery and Equipment

New Woven Wire Screens for Coarse Sizing

LUDLOW-Saylor Wire Co., St. Louis, Mo., has recently announced its "Arch-Crimp" woven wire screens for coarse sizing, the features of which are detailed in a new bulletin. This screen is said to be an entirely new development in the weaving of wire screens of large openings. It is espe-

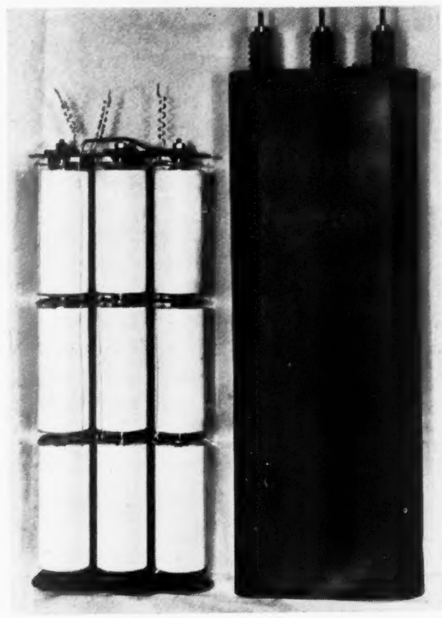
New woven wire screen of large opening

cially designed for severe service on vibrating screens, the manufacturers say, but can also serve for revolving screens, the "Arch-Crimp" forming rigid cylinders or cones which keep their shape until the steel is worn away, it is claimed. Among the features advanced for the screen are: No stretch under tension; resistance of wires to abrasion; extremely tight and rigid weave; no "creeping" between wires and no bulging or sagging under loads.

Improved Cell Type Capacitors Aid Power Factors

THE ELECTRIC Machinery Manufacturing Co., Minneapolis, Minn., has recently announced a new improved line of cell type capacitors for use in power factor improvement. These capacitors are built for either indoor or outdoor use, the outdoor type capacitor being completely enclosed in a sheet steel housing.

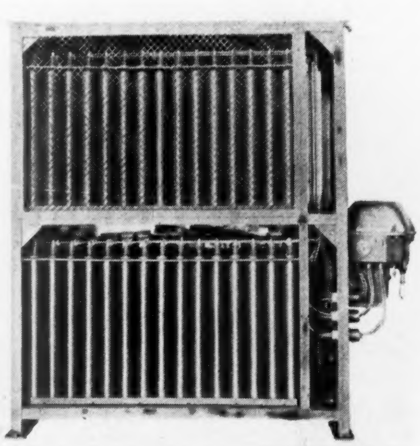
The E-M capacitor consists of an assembly of capacitor cells securely mounted on a rugged steel stand. Each cell is a complete



New cell-type capacitor for indoor use. One screen removed to show construction

capacitor unit, and by connecting two or more cells in parallel, any desired kv-a. may be obtained.

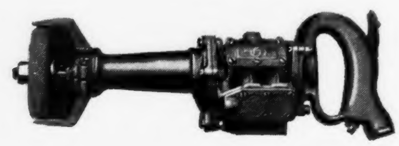
A feature of the new capacitor is the cylindrical roll, which is the "working element" in the capacitor cell. The cylindrical form of construction is said to prevent undue mechanical stress on the tissue. Individual capacitor rolls are mounted on a supporting rack and sealed under oil in the cell. The cell containers are substantially built from 18 gage sheet steel and have welded oil tight joints. Stands for holding the cells are of welded sheet steel.



The standard cell uses 9 capacitor rolls, rigidly mounted on a rack and connected for single- or 3-phase operation

Pneumatic Grinding Machine

CHICAGO Pneumatic Tool Co., New York, has recently brought out the No. 10-A "Little Giant" pneumatic grinding and buffing machine, useful for general light

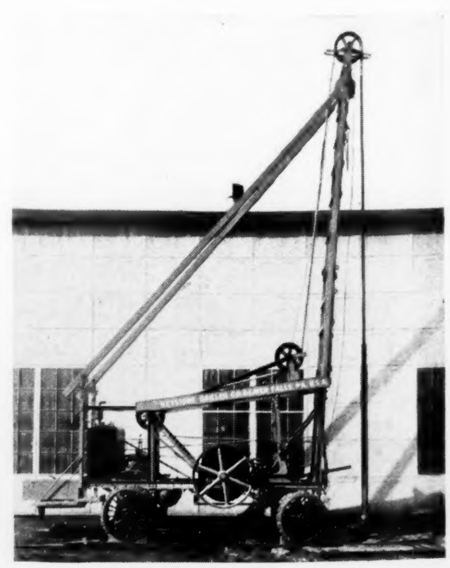


Pneumatic grinder and buffer

work, including the smoothing of flush head rivets and bevelling and polishing marble and granite. This grinder is now equipped with the closed type pistol grip throttle handle as shown in the illustration, instead of the open type, and can also be furnished with the straight type throttle handle as optional equipment. The machine is 16½ in. long overall, weighs 8¼ lb. net and has a capacity wheel measuring 4- by ¾-in.

New Light Traction Blast Hole Drill

SEVERAL new and distinct features are claimed for the No. 1½ ballast hole drill recently brought out by the Keystone Driller Co., Beaver Falls, Penn. The new machine,



Light weight traction blast hole drill

though lighter, is designed to handle heavy weight drilling tools with a long, quick drilling stroke, the manufacturers say. The frame is of steel channels and angles, the walking beams and derrick being of wood; the combination is said to give desired light-

ness, strength and resiliency. Although intended for use with manila cable, the No. 1½ may be equipped with a spudding spring for use with wire line.

Small machines such as these are often moved with the derricks erected, the manufacturers point out, and the increased stability necessary for this is said to have been accomplished by setting the drilling machinery and shafting low on the main sills, while the front posts are shortened. Designed primarily for blast hole drilling, the machine is equipped with iron tired wheels, cutter bands and cleats, but it can be furnished with rubber truck tires in addition for rapid movement over paved roads, if desired. It has three traction speeds forward and one reverse. High speed is about eight m.p.h.

The illustration shows the drill equipped with a 20 hp. four-cylinder Waukasha engine. Electric motor is available for power, if preferred.

New Rotary Air Compressor

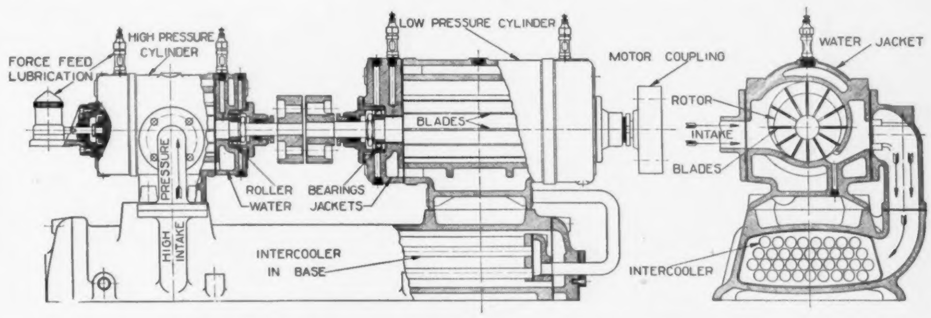
THE FULLER CO., Catasauqua, Penn., is now manufacturing rotary air compressors in accordance with a well-known French design, the manufacturing, sales and patent rights for the United States, Canada and Mexico of which were purchased by the Fuller Co. The only changes made in the design were those necessary to convert to American standards and domestic motor speeds.

Typical details of the new two-stage compressors are shown in the assembly drawings. The intercooler shown in the base is furnished with two-stage compressors up to medium capacity. For high capacity machines, separate intercoolers are furnished and usually mounted on saddles secured to the foundation.

The construction of the single-stage compressor and each cylinder of the two-stage compressor is similar.

The single unit or stage comprises a water-jacketed stator casing, having a cylindrical central bore, provided with an inlet for air (or other gas) at one side, and an outlet for the compressed air on the opposite side. Mounted eccentrically and on the same vertical center line with the central bore is the rotor, the integral stub shafts of which are supported in fixed radial roller bearings.

A number of milled, radial grooves are provided in the rotor in which machined blades of a special steel alloy ride freely. The eccentric mounting of the rotor with respect to the cylinder forms a free space, crescent-shaped in cross-section, which is divided into a series of cells by the blades as they are forced outwardly by centrifugal force into contact with the wall of the cylinder during rotation. The volumes of these cells vary serially from a maximum at the intake side of the cylinder to a minimum slightly beyond the discharge port.



Details of the new two-stage rotary air compressor

One of the features of these machines is the simplicity of lubrication. The force feed lubricating arrangement delivers oil in sufficient quantity to the bearings and, in conjunction with oil grooves at the ends of the rotors, the lubricant passes into the bases of the slots in the rotor, moves outwardly and by centrifugal force on both sides of the blades to maintain a film on the inner surface of the cylinder.

The cylinders are cooled by ample water-jackets in both the wall and cylinder heads. This is said to insure low temperature of the discharged air. Two-stage compressors up to medium size are provided with an intercooler in the base casting, connected into the water-jacket circulatory system. This intercooler is of ample proportions to permit delivery of cool air to the high pressure cylinder. For machines of large capacity, the intercooler is an independent unit which usually is supported on saddles secured to the compressor foundation.

Automatic stopping and starting control is claimed to be easily adaptable to these compressors, due to the very low starting torque. Various types of regulators can be used.

Single-stage units are available for capacities up to 3500 cu. ft. per min. and for pressures up to 55 lb. (gage). Two-stage compressors are constructed for capacities up to 3500 cu. ft. per min. and for pressures from 55 lb. (gage) to 170 lb. (gage).

Vacuum pumps, essentially similar to the compressors in design, are furnished for capacities up to 3500 cu. ft. per min. and suitable for vacuums as high as 29½ in.

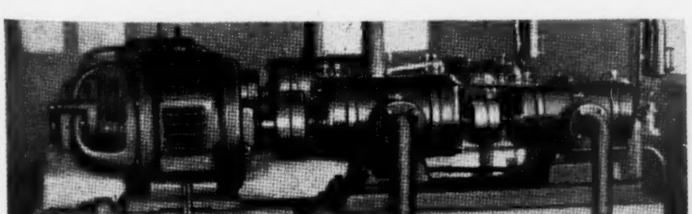
Among the other features claimed for the new machines are the small floor space requirements, comparatively low weights for given quantity of air handled, delivery of air flow free from pulsations, minimization of wearing parts, etc.

The single- and two-stage compressors are usually directly driven through flexible couplings by electric motors or internal combustion engines.

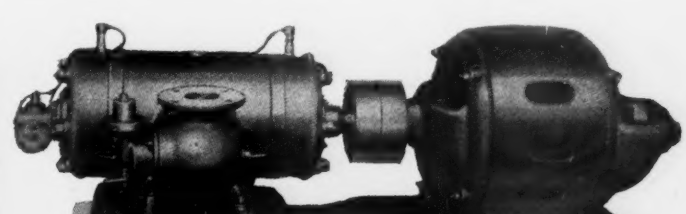
Synchronous Motors

THE GENERAL Electric Co., Schenectady, N. Y., has issued an attractive and well illustrated booklet on synchronous motors, Bulletin GEA 1191, in which is outlined briefly the numerous forms of synchronous motors produced and industrial applications of many of these.

The use of synchronous motors has increased greatly during the past few years due to improved designs that now enable them to fit into applications that were formerly restricted to induction motors. Also, small sized synchronous motors in induction motor frames have opened up a large field of usefulness.



Two high capacity rotary air compressors with intercooler below the floor level



Single-stage, medium sized, direct-driven rotary air compressor with oil reservoir in base casting

Snowflake Lime, Ltd., Operating First Hydrate Plant in the Maritime Provinces

ALTHOUGH lime production was started a good many years ago in the Maritime Provinces, it remained for the Snowflake Lime, Ltd., to put into operation the first hydrate plant. This was installed in 1928 at St. John, N. B., and has since been working to capacity supplying lime hydrate for which a widely expanded market developed in the district due to its lower price as compared with the imported hydrate; freight on the imported product cost from $7 to $8 per ton, it coming from Ohio and Ontario.

New hydrate plant of the Snowflake Lime, Ltd., St. John, New Brunswick

Taking over the St. John interests of Restigouche Co., Ltd. (formerly Stetson, Cutler and Co., Ltd., manufacturers of lime since 1885), the further development of the industry in the district is expected. As a sign of this, old kilns, not in use for 25 years, have been modernized and are now producing. The Snowflake company also acquired the Dolomite quarry adjacent to its works as an ample supply of high magnesia limestone deposits. High calcium lime is also produced.

The St. John plant is under the management of C. A. Beatteay, secretary-treasurer of Snowflake Lime, Ltd. Archibald Fraser is president and Donald Fraser vice-president.—*The Busy East.*

Texas Quarries, Inc., Builds Railway

CONSTRUCTION of a two-mile railroad line from Cedar Park, Texas, to the quarry of the Texas Quarries, Inc., on the Allen ranch, is now under way and the company will be able to transport its Cedar Park stone by rail to the distribution markets.

The Texas Quarries, Inc., is headed by W. H. Johnston, president of the Bloomington Limestone Co. of Bloomington, Ind.

The company has spent more than $30,000 making tests of limestone deposits on its 4000-acre lease near Cedar Park. Tests of the Cedar Park stone were made by the Pittsburgh testing laboratories, the Robert W. Hunt laboratories, U. S. government and University of Texas laboratories.

While Mr. Johnston is president of the Bloomington Limestone Co. and of the Texas Quarries, Inc., the two organizations are entirely separate. Years of experience in handling stone and the enormous handling facilities of the Bloomington company, however, will accrue to the advantage of the Texas company.

Austin will be the permanent headquarters of the Texas Quarries, Inc.

Daniels Sand Co. Sold

DANIELS Sand and Building Co., Harriman, Tenn., is reported to have been sold to a group of employes of the Oliver King Sand and Lime Co., Knoxville. G. J. McAfee, president of the new concern, is credit manager for the Oliver King company; J. H. Agee, vice-president, is the Oliver King sales manager, and C. B. Alexander, secretary-treasurer, is an Oliver King salesman.

The new company will specialize in the production of fine asphalt sands, foundry and traction sands, the first production of these grades in any quantity in Knoxville, it is stated. Dredging capacity will be increased to 300 tons daily in a short time. New offices of the Daniels company are now in the King company building, South Knoxville.—*Knoxville* (Tenn.) *News.*

Ideal Sand Plans Expansion

EQUIPMENT is now being overhauled and repairs under way for the spring opening of the Ideal Sand and Gravel Co.'s plant at Mason City, Iowa. Late in 1929, new dump cars were purchased, a mile of new track laid to a new piece of ground, and other provisions made for moving a tremendous volume of material.

The Ideal company, one of the largest producers in Iowa, shipped 350,000 tons of sand and gravel in 1929, an amount equal to that shipped in 1928. Expectant demand from Iowa's large paving program is expected to increase 1930 production and shipments.—*Mason City* (Iowa) *Globe.*

Dewey Portland Plans $500,000 Improvements to Davenport Mill

AN expansion program that will entail the expenditure of between $500,000 and $600,000, and will necessitate the employment of 185 additional men during the next few months, is announced by the Dewey Portland Cement Co., Davenport, Iowa. The improvements, according to F. E. Tyler, president of the company, include the building of 200,000 bbl. additional storage for cement, installation of a clay wash mill, installation of a system of filters which will reduce the cost of operation of the plant by enabling the kilns to burn more clinker with the same amount of coal, and the installation of a thickener and classifier system which will increase the quality of the product.

"Regarding the thickener," Mr. Tyler said, "the Davenport plant is the only cement plant where this system has ever been installed, and it is the consensus of opinion by experts that the results obtained will far exceed those under any other method of manufacture."

The Dewey Portland Cement Co. enjoyed a successful year during 1929. The plant operated practically continuously during the 12 months of that year under the able supervision of H. F. Tyler, first vice-president. The prospects for 1930 are bright from the standpoint of sales and operations. However, the earnings of the company will be materially reduced due to the recent price drop of 20 cents a barrel in cement over the territory the company serves.—*Davenport* (Iowa) *Times.*

Inland Lime and Stone Co. Awards Seul Choix Contracts

CONTRACTS for the construction of crushing, screening, conveying, storage and loading units of the Inland Lime and Stone Co. at Seul Choix, Mich., have been awarded to the Stephens-Adamson Manufacturing Co., Aurora, Ill., according to the announcement of C. B. Randall, vice-president of the Inland Steel Co. Engineering work will start immediately and construction will begin in the spring as soon as weather conditions permit.

Contracts call for completion of the various units by September 1, 1930. Bids for the construction of concrete foundations, tunnels and steel work for some of the buildings to be erected at Seul Choix will be asked as soon as specifications have been completed by the Inland Steel Co. At the present time there are 250 men working in two shifts employed by the Merritt, Chapman and Scott Corp. in the construction of the huge breakwater. This work is nearing completion, upon which construction of the lighthouse foundation will follow.—*Escanaba* (Mich.) *Press.*

National Sand and Gravel Association 1930 Convention Program

THE FOLLOWING is the official program of the 1930 convention, National Sand and Gravel Association, to be held in Memphis, Tenn., January 28, 29, 30:

CONVENTION PROGRAM, NATIONAL SAND AND GRAVEL ASSOCIATION
TUESDAY, JANUARY 28

Morning Session

Presiding officer, R. C. Fletcher

9:00—Registration—Registration desk located on mezzanine floor.
10:00—President's opening address.
10:15—Address of welcome—Hon. Watkins Overton, mayor of Memphis.
10:30—"Features of Convention Program"—V. P. Ahearn.
11:00—"Road Construction During the Next Decade"—W. C. Markham, executive secretary, American Association of State Highway Officials, Washington, D. C.
11:30—"Changing Trends in the Construction Industry"—T. S. Holden, vice-president, F. W. Dodge Corp., New York City.
12:00—Luncheon of Producers' and Manufacturers Division—J. L. Shiely, chairman.

Afternoon Session

2:30—Opening of machinery exhibit by the Manufacturers' Division—M. B. Garber, chairman.
2:45—Executive meeting of board of directors.
Under the constitution of the association, the board will prepare a report to the convention on the following subjects:
1. Program of association activities during the ensuing year.
2. Budget of expenditures.
3. Nomination of candidates for offices of president, vice-president, secretary-treasurer, and three directors-at-large.
4. Selection from their own number of four members of executive committee for the year 1930.

WEDNESDAY, JANUARY 29

Morning Session

Presiding officer, Hugh Haddow, Jr.

10:00—"The Trade Practice Conference as an Asset to Business"—Henry P. Fowler, U. S. Chamber of Commerce.
10:30—Report of committee on trade relations—Hugh Haddow, Jr., chairman. Discussion of Mr. Haddow's report to be led by the following: John Prince, Stewart Sand Co., Kansas City, Mo.; R. J. Potts, Potts-Moore Gravel Co., Waco, Tex.; V. O. Johnston, The Lincoln Sand and Gravel Co., Lincoln, Ill.

Afternoon Session

Presiding officer, Alex. W. Dann

2:00—"Development of Simplified Practices in American Industry"—R. L. Lockwood, U. S. Department of Commerce.
2:30—"Need for Simplification of Sizes in Sand and Gravel Industry"—F. H. Jackson, U. S. Bureau of Public Roads.
3:00—Report of committee on standard specifications—Stephen Stepanian, chairman.
Discussion of these papers and reports by the following: Ray V. Warren, engineering representative, Western Pennsylvania Sand and Gravel Association, Pittsburgh, Penn.; F. M. Welch, chief engineer, American Aggregates Corp., Greenville, Ohio.; F. A. Bingham, Northern Gravel Co., West Bend., Wis.
7:00—Annual banquet.

THURSDAY, JANUARY 30

Morning Session

Presiding officer, John Prince

10:00—"Some Characteristics of the Ready-Mixed Concrete Business"—H. F. Thomson, vice-president, General Material Co., St. Louis, Mo.
10:45—"Effect of Aggregate Characteristics on the Quality of Concrete"—Stanton Walker.
Discussion led by: D. D. McGuire, materials engineer, Tennessee Highway Department, Nashville, Tenn.
11:30—"Gravel Ballast for Railroad Purposes"—Daniel Hubbard, division engineer, Chesapeake and Ohio Ry.
12:00—"Use of Sand and Gravel in Low-Cost Road Construction"—C. N. Conner, American Road Builders Association.
12:30—Luncheon of delegates.

Afternoon Session

Presiding officer, R. C. Fletcher

2:00—Report of board of directors and induction of new officers.
2:30—Report of committee on cost of cleaning and repairing railroad cars—J. C. Buckbee, chairman.
3:00—"Relationship of the Railroads to the Sand and Gravel Industry"—W. J. McGarry, American Railway Association.
3:30—Reports of officers—Executive secretary, V. P. Ahearn; director, engineering and research division, Stanton Walker.
4:00—Award of ROCK PRODUCTS safety trophy.
4:30—Adjournment.

Universal-Atlas Building Survey

AN INCREASED VOLUME of residential and highway construction and increased farm building in 1930 are expected to more than offset moderate declines anticipated in commercial and public building, according to a survey made by the Universal-Atlas Portland Cement Co., Chicago, among building material dealers located in all sections of the Middle West. More than 1100 dealers contributed opinions based on close observation of local conditions.

Five dealers out of every six expressing views as to the effects of the recent stock market decline on construction in their localities state that it will exert either a favorable influence or no influence at all.

Total construction in 1930 is expected by dealers to exceed 1929 volume in western New York, eastern Pennsylvania, West Virginia, eastern Ohio, northern Illinois, Wisconsin, Kentucky, southern Minnesota and Iowa.

Total construction in 1930 will about equal 1929 volume in western Pennsylvania, western Ohio, Indiana, southern Illinois, northern Michigan, northern Minnesota and South Dakota.

Some decline in total volume is anticipated in central Illinois, southern Michigan and North Dakota.

On the whole, dealers express conservative optimism about 1930 prospects.

National City Bank on Building Prospects

THE National City Bank, New York City, comments on the building situation, as of January 1, 1930, as follows:

Building operations and construction work of a general character constitute the most important factor in the problem of industrial recovery. Such expenditures are the chief variable element between good and bad times, for when they are large all of the industries are active, employment is full, and consumption of every kind of products is at a high rate. Residence and apartment house building has been under restriction during the past year, partly from the scarcity of available funds and partly because of evidences of overbuilding. This probably, on the whole, has been helpful to the situation. Office building space also is somewhat in excess of needs, although a recent survey of 38 leading cities by the National Association of Building Owners and Managers indicates vacancies amounting to only 11.5%, and 10% is considered normal. Industrial construction in 1929 was above the figures for 1928; outside of public utilities it may be expected in 1930 to depend upon the general state of business. Public building, highway construction, municipal improvements, railroad and public utility undertakings will be helped by President Hoover's conferences and also by the lower interest rates now prevailing. The F. W. Dodge Corp. has estimated that the aggregate of construction in 1930 will exceed that of 1929.

It is probably not too much to say that the outlook for large construction work of the nature of municipal, highway, railroad and industrial improvements never was better, and the subsidence of speculation has the very important effect of cheapening capital for these purposes. Capital and credit had been steadily becoming dearer over the last two years, not only in our own country but throughout the world, and the stock market had been the dominating influence. We are of the opinion that in more ways than can be traced the release of several billions of credit from employment in that quarter, and the resulting decline of interest rates for all purposes, will be beneficial to general business and that the effects will be cumulative as they spread.

F. J. Colgan's Widow Elected President of Company

ANNOUNCEMENT was made recently by officials of the Colgan Limestone Products Co. of the election of Mrs. F. G. Colgan as president of the firm to succeed her husband, the late Frank J. Colgan, who died December 19. At the same time the appointment of Paul R. Langel, who has been connected with the company for several years as general sales manager, was made.

The Colgan Limestone Products Co. was founded by the late Mr. Colgan and operated for a number of years before the company was incorporated under the laws of Ohio in 1925. The firm, with a plant at Gibsonburg, Ohio, manufactures and distributes soil liming materials and especially selected lime and stone for glass manufacturing and chemical purposes.

Executive offices of the company will be continued at their present location.—*Columbus* (Ohio) *Citizen.*

L. D. Gilbert Now with Columbia Cement

L. D. GILBERT, former superintendent of the Victorville, Calif., plant of the Southwestern Portland Cement Co., and more recently connected with the Guadalupe Portland Cement Co. project to build a plant at San José, Calif., is now with the new Columbia Cement Co., which contemplates a mill at San Diego, Calif.

News of All the Industry

Incorporations

Fayetteville Sand Co., Syracuse, N. Y., increased capital stock from $5,000 to $20,000.

Big Creek Gravel Co., Inc., Pollock, La., $20,000. J. A. Cook and Henry Williams.

Beam Block Co., Jamaica, N. Y., 200 shares common. H. Gitlin, Jamaica.

Skagit Talc, Inc., Seattle, Wash., $99,000. J. B. McLean, W. P. Stockdale, and W. F. Pooler.

Bangor Crushed Slate Corp., Wilmington, Del., $50,000.

Bangor Central Slate Co., Wilmington, Del., $60,000.

Wapak Sand and Gravel Co., Wapakoneta, Ohio, 1,200 shares common, no par value. W. P. Greer, C. H. Neville and Kathryn W. Cook.

Anchor Block Co., Wilmington, Del., 1,000 shares common. To deal in concrete products.

Princeton Quarries, Inc., Paterson, N. J., $125,000.

Producers Sand and Gravel Co., Ltd., Victoria, B. C., $250,000.

Concrete Products Co., Inc., Cedar Rapids, Ia., $50,000. F. M. Popenhagen, president.

Sand Products Corp., 2489 First National Bank Bldg., Detroit, Mich., $1,500,000 and 15,000 shares no par value. To deal in sand, gravel, cement, etc.

Mid-West Crushed Stone Co., Indianapolis, Ind., changed name to Mid-West Rock Products Corp.

Universal Portland Cement Co., Buffington, Ind., has filed papers changing name of company to Universal-Atlas Cement Co.

Calumet Concrete and Material Co., 400 W. 107th St., Chicago, Ill., $15,000. Chas. Van Houten, Rowe Van Houten and H. F. Flahavhan.

York Concrete Co., Reading, Penn., $5,000. Thomas I. Snyder, treasurer, Reading; George B. Balmer and J. Victor Grimm, both of Reading.

Eliot Sand and Gravel Co., New York City, $6,000. E. P. Foster, 141 Broadway, New York City.

Edgerton Sand and Gravel Co., Edgerton, Wis., $50,000, or 500 shares common stock at $100 each. Stanley W. Slagg, B. M. Doerr and F. M. Lipke.

Indiana Phosphate and Fertilizer Co., Inc., Franklin, Ind., 25 shares, par value $100 each. Charles M. Snepp, Elba L. and D. Branigan.

New Era Concrete Co., 509 Cooper St., Camden, N. J., $50,000 (500 shares common stock, par value $100 each). Charles A. Smith, Moorestown, N. J.; Harry B. Capehart and Cecil W. Rotzell, both of Camden.

Building Stone Association of Indiana, Inc., Bloomington, Ind. To promote the use of Indiana limestone as a building material. Wm. H. Johnson, Jesse G. Ray, John Edgeworth, Henry A. Woolery, and John L. Torphy.

Quarries

Columbia Quarry Co., St. Louis, Mo., will erect a $75,000 plant at Bonne Terre, Mo., to quarry, crush, screen and prepare 500 tons of dolomite daily.

American Black Granite Co., Minneapolis, Minn., has appointed M. A. Tessner superintendent of its Mellen (Wis.) quarry, to succeed Rudolph Effenberger, who has been transferred to the Ashland (Wis.) plant.

Rainbow Granite Co., Sacred Heart, Minn., is to move its plant to Granite Falls, Minn. The company is erecting its buildings on property of the Great Northern railway, and granite will be taken from the Rock Valley quarry near here.

Taylor Stone Co.'s branch plant on Tenth St. west of Offnere St., Portsmouth, Ohio, is being moved into a new frame building erected by the company at 14th and Chillicothe Sts. The Tenth St. plant will be abandoned.

Warren Marble and Granite Co., Warren, Ohio, at its annual meeting on January 3 elected the following officers: W. F. Corbin, president and treasurer; Col. F. S. Van Gorder, vice-president, and Philip Corbin, secretary.

Sterling Grinding Wheel Co., Tiffin, Ohio, the abrasive division of the Cleveland Quarries Co., Cleveland, Ohio, has completed work on the first and largest of the new buildings in its expansion program. The building contains 18,000 sq. ft. of floor space.

Sand and Gravel

Keystone Gravel Co., Indianapolis, Ind., received a refund of $508 from the government for overpayment of federal income tax. **Mohawk Gravel Co.**, Indianapolis, received refund of $785.

Iowa City, Iowa. C. E. Thomas, who has been operating the Hawkeye Materials Co. here with H. J. Dane, has purchased Mr. Dane's holdings in the corporation and will conduct the business in the future.

Hurst Gravel Co., Dayton, Ohio, reports the theft of 2700 ft. of copper wire from the company's lower plant on North Findlay St. The wire, which was strung on poles around the plant, was owned by the Dayton Power and Light Co. The thieves were evidently experienced electricians, for the wires carried 4000 volts, and inexperienced persons might have been killed in attempting to cut the lines. The plant will be unable to operate until new wire is restrung, and replacement costs are estimated at $500.

Seaboard Sand and Gravel Corp., New York City, suffered damages during a recent snowstorm when three of its barges broke loose from the tug, Admiral Rowe, which was towing them from Norwalk, Conn., to Port Jefferson with cargoes of sand. The barges were cast loose just outside of Norwalk and piled up several hours later on the rocks at Fort Slocum, near New Rochelle, N. Y. Captain Cornelius Boon on barge 29 and Captain Theodore Ryerson on barge 18 were rescued by soldiers from Fort Slocum. No one was on the third barge.

Gypsum

United States Gypsum Co.'s Oakfield (N. Y.) plant was damaged by fire on January 7. Losses are estimated at $35,000.

Standard Gypsum Co., San Francisco, Calif., has moved its Seattle offices from the Alaska Bldg. to new quarters at the Seattle plant, 1871 Sixteenth avenue, southwest.

Atlantic Gypsum Products, Ltd., Halifax, Nova Scotia, during 1929 shipped a total of 193,000 tons of gypsum, as compared with 63,238 tons in 1928 and 33,376 tons in 1927. This year, according to present plans, the capacity of the plant will be increased and a total of 250,000 tons of crushed gypsum will be available for the United States markets.

Cement

Wabash Portland Cement Co., Osborn, Ind., is now completing an addition to its kiln facilities.

Newaygo Portland Cement Co., Newaygo, Mich., gave its employes bonus checks based on 8% of the total earnings for the year 1929.

North American Cement Corp. announces the occupancy of offices at 1011-14 Baltimore Trust Bldg., Baltimore, Md.

South Dakota Cement Plant, Rapid City, S. D., has completed the biggest business year in its history. Sales in 1929 totaled 546,567 bbl. of cement. This is 33,000 bbl. above the record for 1928, which was the largest up to that time.

Lehigh Portland Cement Co. has completed a general overhauling of its plant at Metalline Falls, Wash., and is now operating one kiln. Two new air separators, to operate in conjunction with the closed-circuit grinding system recently inaugurated, are being installed.

California Portland Cement Co.'s new office building at Colton, Calif., is nearing completion and soon the final touches will have been applied. The building, two stories in height, is constructed of concrete and is the last word in convenience and modernism.

Lawrence Portland Cement Co., Northampton, Penn., held its semi-annual safety meeting recently. Gus Rodgers of the Pennsylvania Manufacturers Association gave an interesting talk on safety. David Adam, safety director of the plant, was toastmaster, and M. S. Ackerman, Jr., superintendent, spoke about the prospects of the company for the coming year. Lunch was served following the meeting.

Idaho Portland Cement Co., Pocatello, Idaho, has completed the construction of storage facilities for 75,000 bbl. of cement at its plant at Inkom, Idaho. The company now has storage space for 100,000 bbl. E. J. Simons, president of the company, reports that the high season of production last year was reached in August, one month after the opening of the plant, when 25,000 bbl. were manufactured.

Lone Star Cement Co., Louisiana, New Orleans, La., held a celebration recently at its plant to mark the 13th consecutive month during which no accidents had occurred at the plant. Leaders in the industrial life of New Orleans, members of the executive board of the New Orleans safety council, and city officials attended the celebration. T. Semmes Walmsley, acting mayor, was the chief speaker.

Agricultural Limestone

The Ustick Limestone Association, Ustick, Ill., has chosen its new officers for the coming year, as follows: Frank Badtke, president; Wm. Mathew, vice-president; Adam Aitken, secretary, and E. A. Smith, treasurer. The company was organized about five years ago and operates a crusher and two dump carts. Many of the farms of Ustick are being limed by this organization.

Cement Products

Anamosa Cement Products Co., Anamosa, Iowa, announces that C. W. McMahan is retiring from the company and Arthur B. White and Clayton Hartman are assuming full ownership.

Miscellaneous Rock Products

American Mineral Products Co., Inc., Hartford, Conn., will construct a new one-story feldspar grinding mill, 36x200 ft., at Walpole, N. H., to cost more than $85,000 with crushing, conveying and other machinery. Walter Furey is engineer.

General Mica, Inc., has completed plans for increasing the capacity of its Pueblo, Colo., plant, according to Joseph A. Stanko, president. The company plans to bring cutting and punching machinery to its Blende, Colo., plant from Taos county, New Mexico, where it owns and operates large mines. At present the Blende plant is equipped only to grind mica into powder.

Obituaries

M. P. Lane, secretary-treasurer of the Southern States Portland Cement Co., Rockmart, Ga., died on December 9.

Clarence E. Wilson, founder of the Cookeville Marble and Granite Works, Cookeville, Tenn., with which he had been connected for almost 40 years, passed away at Nashville, Tenn., at the age of 61.

Harry Logan Monroe, commercial vice-president of the General Electric Co., Schenectady, N. Y., who had represented the company in Chicago since 1913, died recently at Dallas, Tex., where he had gone for his health.

Personals

Sewell L. Avery, president of the United States Gypsum Co., Chicago, Ill., has been elected a director of the Continental Illinois Bank and Trust Co., Chicago.

George J. Whelan, president and general manager of the Kelley Island Lime and Transport Co., Cleveland, Ohio, has been elected a director of the Lorain Street Savings and Trust Co.

Charles E. Acker, formerly assistant treasurer of Baldwin Locomotive Works, Philadelphia, Penn., has been chosen treasurer to succeed Wm. de Krafft, who resigned.

Charles E. Wilson, assistant to Vice-President Charles E. Patterson of General Electric Co. at the Bridgeport works, has been named manager of the merchandise department, succeeding the late Major H. C. Houck.

A. W. Berresford has been made president of the Connecticut River Stone Products Corp., Middletown, Conn., succeeding E. P. Decker, who resigned recently. G. L. Baldwin resigned as vice-president and general manager of the company to accept an offer in Providence, R. I., and A. B. Hubbell, sercetary and treasurer, is now acting as manager of the plant.